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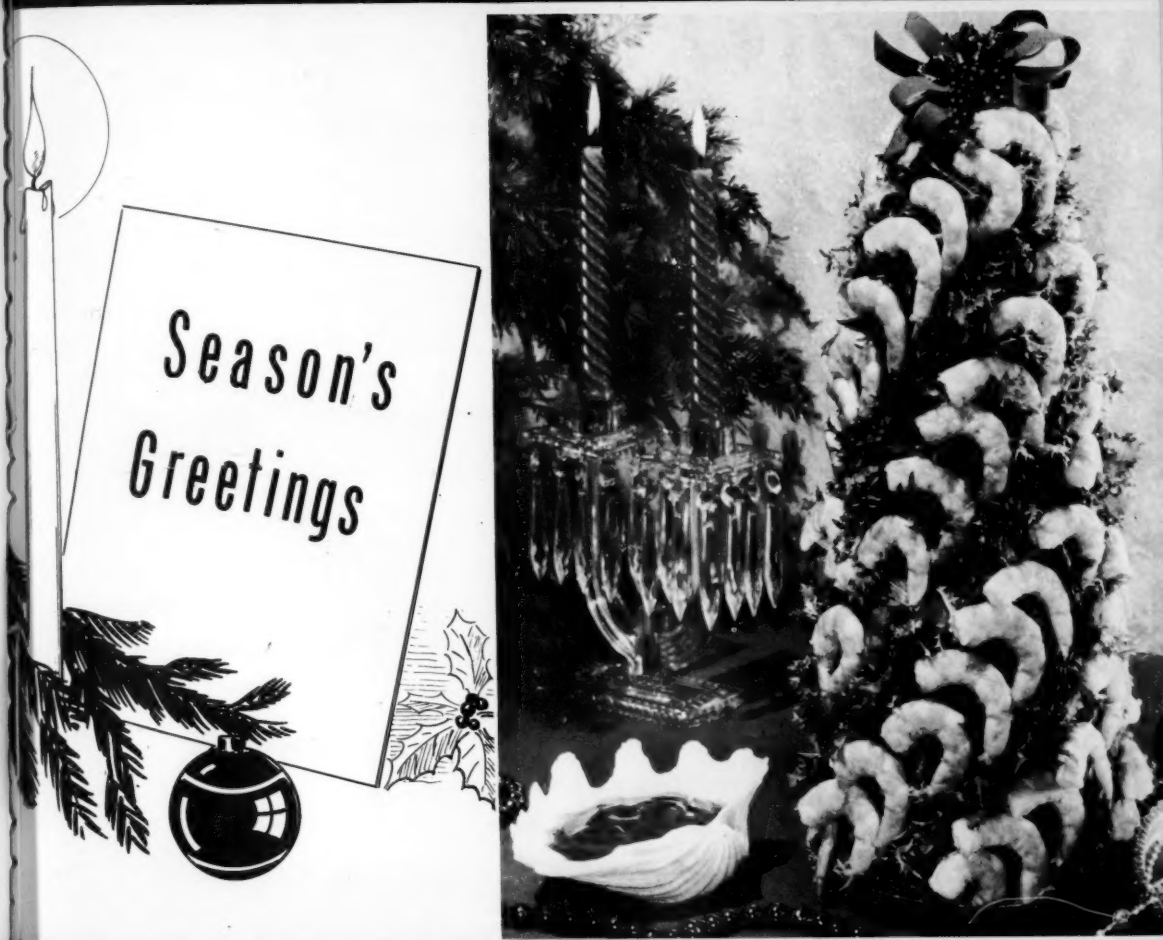

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UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington, D.C.

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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
G. A. Albano and H. Beasley, Assistant Editors

Address correspondence and requests to the: Chief, Fishery Market News Service, U.S. Bureau of Commercial Fisheries, 1815 North Fort Myer Drive, Room 510, Arlington, Va. 22209.

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5/31/68

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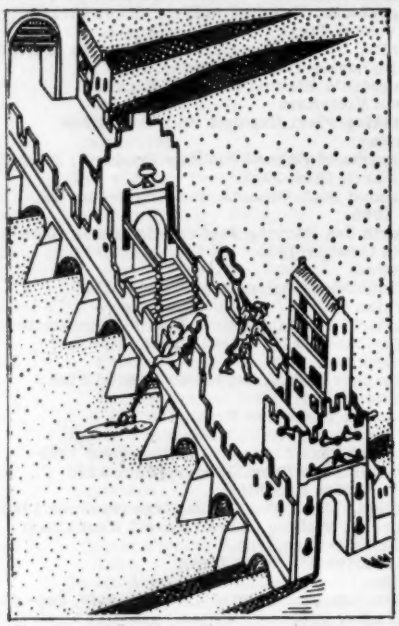
IRISH SALMON HAVE BEEN VALUED FOR OVER SEVEN CENTURIES

Since early times, salmon fisheries have been regarded as a source of wealth in Ireland. Irish historical references to salmon date from the 12th century. By the 16th century, salmon fishing rights in Irish rivers were among the most valuable rewards which could be given supporters of the Crown.



Showing the spearing of salmon in 1651 from a bridge in Galway.

The spear was one of the first implements (other than bare hands) used to catch salmon. The "casting spear off the bridge in Galway" was a valuable asset mentioned in the records of the year 1538. But fisheries regulation also has a long history, and the use of spears to take salmon from rivers was banned as early as 1716. The spears were too efficient.

Other fishing methods developed early. Angling with hook and line was sufficiently well established by 1641 for a Dame Elinor Blake to have the right of "one-fourth part of every salmon and trout taken by angling betwixt the bridge and the wood quay near the town of Galway."

Before the middle of the last century, V-shaped structures called head weirs were quite common in the estuaries of many Irish rivers. An early illustration of a weir appears in Thomas Phillips' Military History of Ireland, written in 1685. Weirs in river mouths were later found to be obstructions to navigation and most were declared illegal. Fixed nets in the open sea were introduced off the coast of Ireland in about 1815. These too were later restricted, and today only about 30 are in use on the Irish coast.

The beach seine or haul net is now the most common commercial method of fishing for salmon in Ireland. It is also one of the most ancient. As far back as the reign of King John, such nets were used to supply salmon for the King's kitchen.

A detailed story of fishing for salmon in Ireland under the title "The Pursuit of Salmon in Ireland," has been recently published in the Proceedings of the Royal Irish Academy, Vol. 63, Section C, No. 6. (Irish Times reprint in the Irish Skipper, January 1965.)

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December 1965 Washington, D. C. Vol. 27, No. 12

A JAPANESE GILL-NET FISHERY FOR BOTTOMFISH IN THE GULF OF ALASKA

By George K. Tanonaka* and Jiro Nishimoto*

ABSTRACT

The Seiju Maru No. 3 was 1 of 4 factoryships authorized by the Japanese Fisheries Agency to fish in the Gulf of Alaska and adjacent areas for bottomfish during the spring and summer of 1963. She was accompanied by three catcher vessels which fished bottom gill nets at depths of 150 to 1,000 meters (492 to 3,280 feet) for rockfishes and sablefish (Anoplopoma fimbria). Fishing began April 23 south of Unalaska Island; thereafter to September 20 the fleet moved generally from west to east. Observers from the United States accompanied the fleet to collect data to assist in the evaluation of the effect on Pacific halibut (Hippoglossus stenolepis) of fishing for other bottomfish.

Fishing was concentrated on sablefish from early May; success increased as the fleet moved eastward. Sablefish were most abundant between 500 and 900 meters (1,640 and 2,953 feet); blackthroat rockfish (Sebastodes aleutianus) between 300 and 600 meters (984 and 1,968 feet); and arrowtooth flounder (Atheresthes stomias) and Pacific ocean perch (Sebastodes alutus) between 200 and 500 meters (656 and 1,640 feet). Eighty-six halibut were captured at depths of 200 to 800 meters (656 to 2,625 feet); most were taken between 400 and 500 meters (1,312 and 1,640). With one exception (May 4), halibut catches contributed less than 1 percent of the daily landings. All halibut were dead when landed.

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INTRODUCTION

To advise on the kinds of information needed to assess the effects on Pacific halibut (Hippoglossus stenolepis) of a proposed Japanese fishery for bottomfish in the Gulf of Alaska[1/], the International North Pacific Fisheries Commission (INPFC), at its Ninth Annual meeting in Seattle, November 16, 1962, appointed the Gulf of Alaska Groundfish Committee. The Committee recommended (INPFC Document 601) on February 18, 1963, in Tokyo, Japan, that the official responsibility of compiling, tabulating, and analyzing the commercial catch records be delegated to the Japanese Fisheries Agency. The Committee also recommended that trained observers from Japan, Canada, or the United States collect information supplementary to that contained in fishing logbook records to assist in the evaluation of the effect on halibut of fishing for other bottomfish. In addition, it recommended biological observations on commercially important species.

This report deals with observations and data collected aboard the Seiju Maru No. 3 factoryship, April 23-September 20, 1963, by two observers from the U. S. Bureau of Commer-

*Fishery Biologists, Biological Laboratory, U. S. Bureau of Commercial Fisheries, Seattle, Wash.

1/Under the International Convention for the High Seas Fisheries of the North Pacific Ocean (INPFC 1954), Japan agreed to abstain from fishing for halibut originating along the coast of North America.

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cial Fisheries. George Tanonaka was aboard the factoryship on April 27-June 28, and Jiro Nishimoto from June 29-September 20.

FISHING OPERATIONS

The Seiju Maru No. 3 (table 1), a refrigerated factoryship chartered by the Yutaka Fishing Company of Tokyo, Japan, was accompanied by three catcher vessels which fished bottom gill nets for bottomfish in the Gulf of Alaska and adjacent areas during April-September 1963. This test-fishing with bottom gill nets was conducted to explore the commercial possibilities of capturing bottomfish in areas where depth, bottom topography, and steepness of the continental slope normally prevent trawling.

Table 1 - Positions of Bureau of Commercial Fisheries-Atomic Energy Commission Trawling Stations off the Columbia River, Oreg.

Station Designation	Depth (Fathoms)	Position		Station Designation	Depth (Fathoms)	Position	
		N. Lat.	W. Long.			N. Lat.	W. Long.
1A	50	46°08.2'	124°12.3'	14A	375	45°56.7'	124°51.0'
2A	75	46°07.4'	124°31.6'	15A	400	45°53.6'	124°52.6'
3A	100	46°03.4'	124°39.4'	16A	425	45°59.2'	124°52.1'
4A	125	46°02.2'	124°43.1'	17A	450	45°54.1'	124°55.5'
5A	150	46°02.8'	124°43.8'	18A	475	45°52.2'	124°52.5'
6A	175	45°59.6'	124°44.1'	19A	500	46°02.7'	124°57.3'
7A	200	46°00.3'	124°45.4'	23A	600	45°44.5'	124°53.9'
8A	225	45°58.2'	124°45.0'	25A	650	45°44.3'	124°54.0'
9A	250	45°58.2'	124°46.2'	29A	750	45°36.3'	124°53.7'
10A	275	45°59.9'	124°49.1'	31A	800	46°01.8'	125°04.5'
11A	300	45°57.5'	124°48.8'	33A	850	45°54.0'	125°08.8'
12A	325	45°58.0'	124°50.3'	35A	900	45°50.0'	125°10.6'
13A	350	45°56.0'	124°49.5'	41A	1,050	45°42.2'	125°13.0'

Principal species caught were arrowtooth flounder (Atheresthes stomias), Pacific ocean perch (Sebastodes alutus), blackthroat rockfish (Sebastodes aleutianus), and sablefish (Anoplopoma fimbria). The fleet also "trial-fished" for Pacific herring (Clupea harengus pallasii) with surface gill nets during April and occasionally during the remainder of the trip, but had no success.

Table 1a - Vessel Specifications and Complement of Seiju Maru No. 3 Fleet

Name	Type	Tonnage (Metric)	Dimensions (Feet)			Speed (Knots)	Horsepower	Ship's Complement	Navigational Equipment
			Length	Width	Depth				
Seiju Maru No. 3	Refrigerated Factoryship	1,184.2	214.3	36.1	17.4	11	1,700	1/85	Radar, loran, direction-finder, depth-recorder, auto-gyro compass.
Kaiko-Maru No. 2	Catcher	83.7	77.1	17.1	8.7	8	270	18	Radar, direction-finder, depth-recorder.
Kyokko Maru No. 3	Catcher	74.9	79.7	16.1	7.8	9	270	18	Radar, direction-finder, depth-recorder.
Mitsu Maru No. 23	Catcher	84.1	81.0	17.4	8.5	9	270	18	Radar, direction-finder, depth recorder.

1/Personnel of factoryship included 50 fish processors and miscellaneous personnel, 30 ship's crew, and 5 company personnel.

Table 1b - Holding Capacity of Factoryship

Location	Volume	Weight	Utility
	Cubic Feet	Metric Tons	
Below deck: Hold no. 1	1,302.6	19.4	Dry storage
" " 2	15,309.0	227.5	Gear storage
" " 3	17,815.9	265.0	Cold storage
" " 4	17,494.7	260.2	" "
Total	51,922.2	772.1	
Main deck freezing room no. 1	204.7	3.0	Sharp freezing
" " 2	204.7	3.0	" "
" " 3	204.7	3.0	" "
Total	614.1	9.0	

Table 1 gives the vessel specifications and ship's complement of the Seiju Maru No. 3. fleet.

AREA: Fishing by the fleet of the Seiju Maru No. 3, as authorized by the Japanese Fisheries Agency, was restricted to an area in the Gulf of Alaska bounded by longitudes 170° W. and 145° W., on the south by latitude 50° N., and on the north by the 150-meter depth contour. Actual fishing, however, was only between the 150- and 1,000-meter (492- and 3,280-foot) depths (fig. 1). The actual fishing areas are divided into statistical areas as determined by the Gulf of Alaska Groundfish Committee.2/

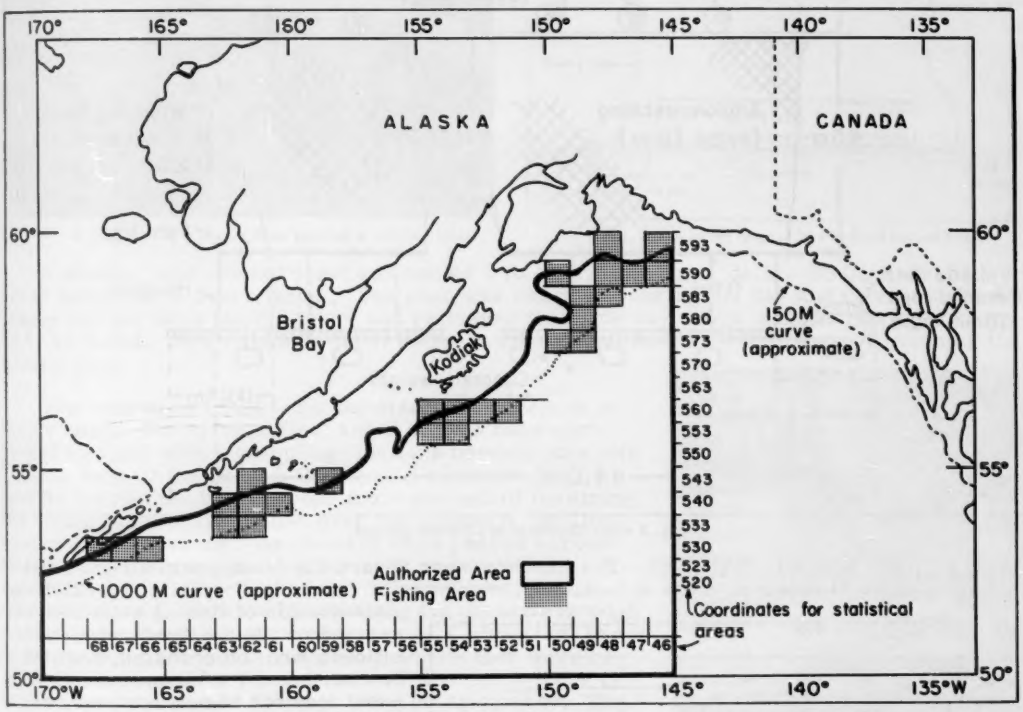

Fig. 1 - Authorized and actual fishing area of the Seiju Maru No. 3, April 24-September 20, 1963.

GEAR: Test-fishing by the Seiju Maru No. 3 fleet probably represented the first commercial use of bottom gill nets in Alaskan waters to fish bottomfish. The gear was essentially a gill net constructed to fish 3 feet from the ocean bottom. A tan (shackle) of gear was about 152 feet long and 14 feet deep; mesh sizes ranged from 4.5 to 5.5 inches, stretched measure. The number of tans of various mesh sizes are given below:

Mesh Size (inches)	Number of Tans
4.5	50
4.7	400
*5.0	650
5.4	15
*5.5	85

*Fished only after July 6.

2/Statistical areas include intervals of 1 degree longitude and 30 minutes latitude. Area numbers are prefixed by longitude and are followed by the latitude as shown in fig. 1.

Specifications of the bottom gill net are given diagramatically in fig. 2. Nets in a string of gear had the same mesh size. Tans of varying mesh sizes were, however, combined to give experimental strings or were incorporated in strings to replace nets lost or damaged.

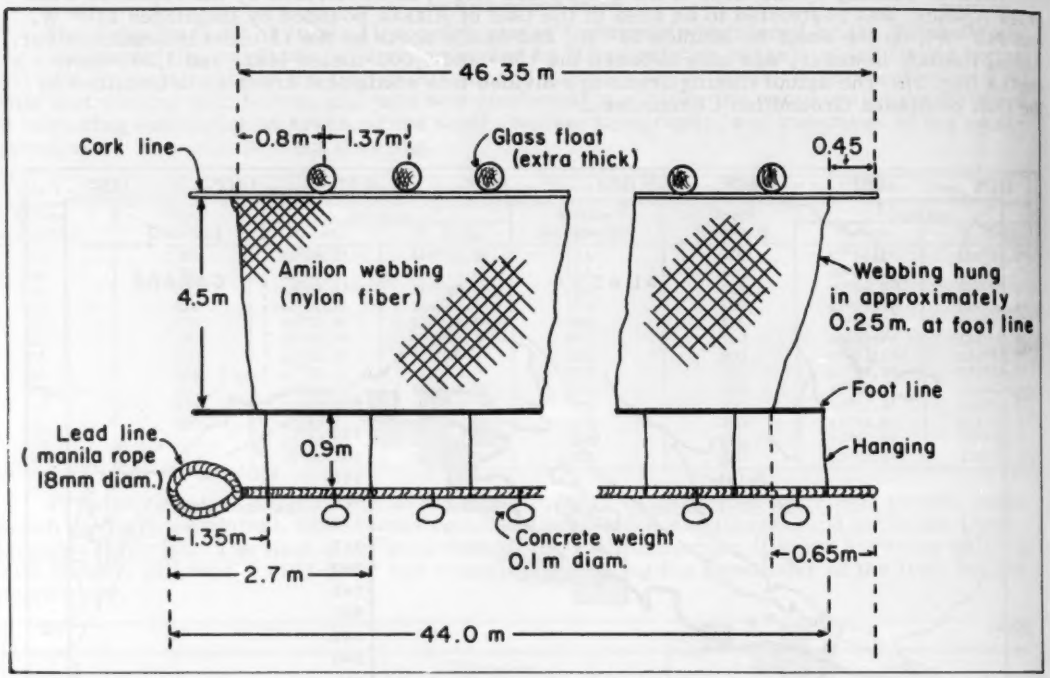

Fig. 2 - Specifications of a bottom gill net.

METHODS AND TECHNIQUES: The fleet manager aboard the factoryship directed fishing operations and selected areas to be fished. Analyses of detailed information on catch and coordination of fishing activities were carried out by the fishing-operation officers who, on occasion, boarded catcher boats for observations. The exact location of set, however, was generally left to the discretion of the master fisherman aboard each catcher boat, who considered the following items: character of sea bottom, desired depths, and direction and speed of current.

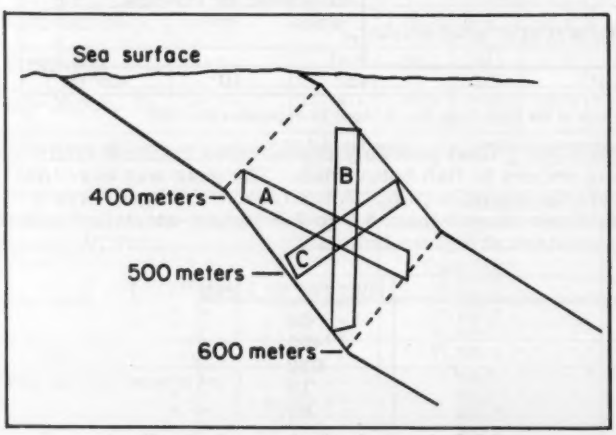

Fig. 3 - An example of trial sets on sea bottom.

Trial sets usually initiated fishing in a new area. In the example of fig. 3, catches made in trial sets "A" or "B" were observed, and if type "A" or type "B" indicated that fish were caught mostly between (for example) 450 and 550 meters, then subsequent sets were made in type "C" position for that area.

Setting of a string of gear normally took 15 to 25 minutes, depending on sea condition and depth. From 25 to 45 tans were set from the stern as the vessel moved forward at about 3 knots (see fig. 4). Items were let out in the order: flag pole and marker floats; hauling rope; anchor; gill nets; anchor; hauling rope; and another marker. A radio buoy usually was attached to one end of the string or to the first marker float (fig. 5).

Fig. 4 - Setting sunken gill nets from stern of a catcher boat.

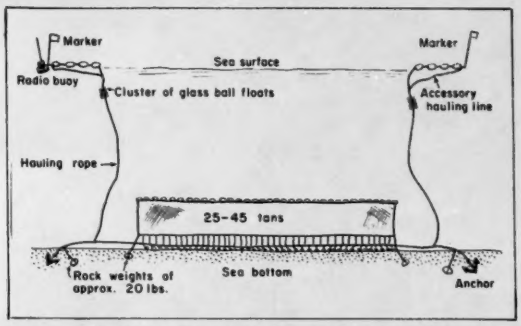

Fig. 5 - A string of gear in a typical set position.

A catcher boat normally set and hauled 2 to 4 strings of gear daily. Strings usually were set at intervals of 3 to 5 miles. The gear was either set during the day and retrieved the following day (or days later), or set and retrieved the same day. Nets were in the water from $8\frac{1}{2}$ to 48 hours. Size of catch, depth fished, and sea condition were the factors governing the fishing time.

The nets were lifted from the starboard foredeck of the catcher. The marker float and the radio buoy were picked up first with a grappling line or a bamboo pole with a metal hook at the end. A line hauler required $\frac{1}{2}$ to 1 hour to take in the hauling rope from one end of the string; the string of nets was hauled over the sheave of the line hauler in 1 to 2 hours. As the nets were passed across the foredeck, the weights (either rock or concrete) were removed and the fish cleared from the webbing (fig. 6). The nets were then passed back along the portside through a wooden or sheet-metal chute and over a horizontal bamboo-pole net guide to the rear deck, where they were repiled in readiness for the next set. The weights were retied on the lead line as the nets were being stacked. The total hauling time for a string of gear was 2 to 4 hours, depending on the depth fished, number of fish, and sea condition.

Fig. 6 - Sunken gill nets being hauled aboard a catcher boat.

The cylindrical drum line hauler was mechanically driven. Secured on the deck floor, near to the line hauler, was an "open-throated" block used by the fishermen to pull the lead line from the line hauler. A bamboo-pole guard, lashed across the starboard side of the catcher just below the line hauler, guided the net to the gurdy.

Seven to 9 crewmen normally worked on the foredeck. One guided the lead line over the sheave, two pulled the lead line from the line hauler and removed the weights, and others removed fish and disentangled the nets. Captured fish, picked out by hand or removed by shaking the net, were stowed in shallow fish holds under the foredeck. When the fish holds were

filled, the remaining fish were left on the foredeck to be placed later into transfer nets. The catchers iced their catch whenever it was not transferred to the factoryship on the day of capture.

TRANSFER OF CATCH: After drifting at night, the factoryship ran an average of 10 to 30 miles a day to receive the catch from the catcher boats. The catch usually was transferred in the late afternoon and early evening. In calm or moderate seas, the catcher boat pulled alongside the drifting factoryship to unload her catch and damaged nets (fig. 7). The entire transfer took 10 to 20 minutes. Once aboard, the catch was spilled onto the deck and pushed down to the workers for processing.

Fig. 7 - Transfer of catch from catcher boat to factoryship.

In rough seas, catcher boats were positioned approximately 200 yards from the starboard side of the factoryship. The factoryship then drifted a wire cable, equipped with floats and snap-hook line, out to the catcher. Cargo nets filled with the catch were then attached to the snap-hook line, dumped from the catcher, towed through the water, and brought aboard the factoryship.

PROCESSING

Selection of species to be retained and processing methods aboard the factoryship depended primarily on market requirements, and, secondarily, on available holding space. Species always retained were sablefish, rockfishes, and arrowtooth flounder.

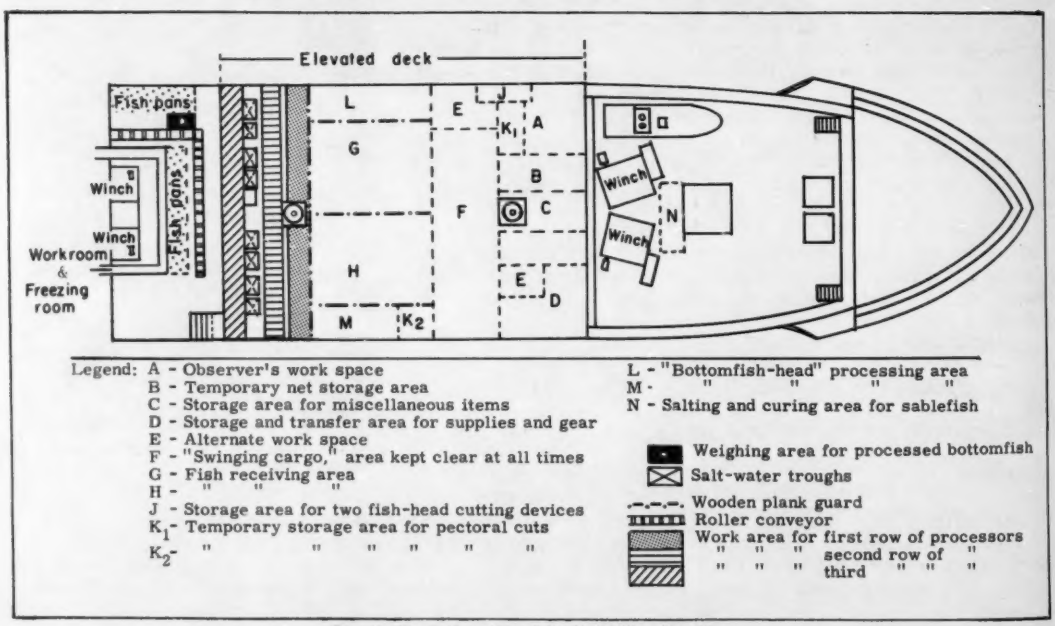

Fig. 8 - Forward section of the Seiju Maru No. 3.

Fish were processed on an elevated deck constructed about 3 feet above the regular deck. This elevated deck spanned the width of the foredeck and was about 50 feet long. A center plank-guard 1½ feet high divided the fish receiving area of this operational deck into two sections (areas G and H of fig. 8); those two sections, in turn, had side and front plank guards to retain the catch.

SABLEFISH: Sablefish were processed in an assembly-line manner (fig. 9). The 10 workers in the top row cut and gutted the fish; members of the ship's crew working on the unloading deck also assisted. The second row of 12 workers then cleaned the body cavity with metal scoops attached to a continuously flowing sea-water system. Cleaned fish were thrown into troughs of salt water behind those workers. The wooden troughs measured approximately 2½ feet by 1½ feet; a piece of net attached to the trough served as a brail, enabling workmen to rinse and remove the fish by agitating and lifting the net. The third row of workers then sorted and placed the dressed fish into pans of 10- and 20-kg. (22- and 44-pound) capacity. The tails of large sablefish were cut off at this time. Pans were weighed before they were passed into the freezing units on roller conveyers.

Fig. 9 - Processing fish aboard the factoryship Seiju Maru No. 3.

Liver and pectoral sections of sablefish were also prepared (fig. 10). This was done in the side aisles and elsewhere in the unloading areas. Livers were put into pans of 10- and 20-kg. capacity and frozen; pectoral sections were piled on deck to be transferred later by bamboo baskets for washing and freezing. In addition, approximately 300 dressed sablefish (all small) were salted experimentally.

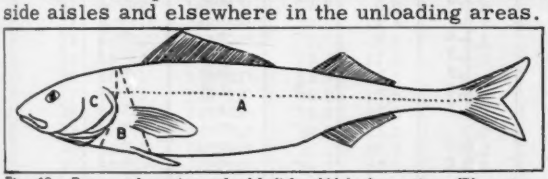

Fig. 10 - Processed sections of sablefish: (A) body section, (B) pectoral section, and (C) waste.

BLACKTHROAT ROCKFISH: Normally, large catches of blackthroat rockfish were separated aboard the catchers prior to transfer to the factoryship. Once separated, the rockfish were quickly beheaded by a manually-operated cutter on the port side of the unloading deck (fig. 8), and cut laterally into two unequal portions by workers in the first row. The fish were then cleaned, rinsed, and placed in pans of 10- to 20-kg. capacity for freezing.

PACIFIC OCEAN PERCH AND ARROWTOOTH FLOUNDER: Pacific ocean perch and arrowtooth flounder were beheaded, gutted, and frozen. Small arrowtooth flounders were discarded; tails of the larger ones were cut off.

FREEZING AND PACKAGING: Temperatures for sharp freezing normally were -28° to -30°C. (-18.4° to -22.0° F.). After about 8 hours, or on the following day--depending on the quantity being frozen--the blocks of fish were removed from the pans, glazed with sea water, and packaged in prelabeled, individual paper cartons. These cartons were than placed in 1 of 2 cold-storage holds to await shipment to Japan via a supply vessel.

CATCH RECORDS

In commercial fishing like that of the Seiju Maru No. 3, time was too short to record and tabulate exact weights or number of fish captured. Consequently, the catch by weight reported by company officials was based on the following:

1. The approximate numbers of fish captured were noted aboard the catcher boats and converted to weight for each string of gear. The data were radioed to the factoryship immediately after each haul. A record was kept by the fishing-operation officer aboard the factoryship on catch by weight of major species for each string of gear.

Table 2 - Daily Landings of the Seiju Maru No. 3 Fleet, April 24-September 20, 1963

Date	Mothership Noon Position		Catch (Metric Tons)					Halibut[1]			
								Under 66 cm.		Over 66 cm.	
	Lat. N.	Long. W.	Total Catch	Sablefish	Arrow-Tooth Flounder	Black Throat-Rockfish	Pacific Ocean Perch	Number	Avg. Wt. (Kg.)	Number	Avg. Wt. (Kg.)
April 24	53°40'	164°20'	-	-	-	-	-	-	-	-	-
25	53°22'	165°15'	-	-	-	-	-	-	-	-	-
26	54°04'	165°00'	-	-	-	-	-	-	-	-	-
27	53°25'	165°30'	-	-	-	-	-	-	-	-	-
28	54°94'	162°38'	1.3	0.6	-	0.2	0.5	-	-	-	-
29	53°53'	163°17'	1.3	1.3	-	-	-	-	-	-	-
30	54°11'	161°28'	2.6	2.2	0.2	-	0.2	5	1.6	-	-
Total			5.2	4.1	0.2	0.2	0.7	5	1.6	-	-
May 1	54°09'	160°44'	5.2	4.8	0.2	0.2	-	8	2.0	3	5.4
2	54°03'	162°11'	3.8	3.8	-	-	-	11	1.7	3	3.9
3	54°04'	161°35'	2.4	2.2	0.2	-	-	-	-	-	-
4	54°15'	159°34'	3.6	3.2	0.2	-	0.2	20	1.9	7	4.2
5	53°59'	161°46'	2.2	2.0	0.2	-	-	1	1.2	-	-
6	54°03'	161°42'	2.6	2.2	0.4	-	-	-	-	-	-
7	54°04'	161°35'	1.8	1.8	-	-	-	1	2.9	-	-
8	54°50'	157°27'	3.5	3.5	-	-	-	-	-	-	-
9	54°12'	161°17'	2.8	2.8	-	-	-	2	1.6	-	-
10	54°13'	160°49'	1.0	0.8	0.2	-	-	-	-	-	-
11	54°08'	162°24'	Running to new fishing area								
12	55°24'	155°52'	7.2	7.2	-	-	-	-	-	-	-
13	56°15'	152°55'	11.2	11.0	0.2	-	-	-	-	-	-
14	56°15'	152°58'	13.0	12.6	0.4	-	-	1	2.5	-	-
15	56°21'	152°36'	12.6	11.4	1.2	-	-	-	-	-	-
16	56°24'	152°30'	7.0	7.0	-	-	-	-	-	-	-
17	56°27'	152°08'	5.8	5.6	0.2	-	-	-	-	-	-
18	56°24'	152°13'	4.7	4.7	-	-	-	1	1.4	-	-
19	56°19'	152°15'	13.2	10.6	-	2.6	-	2	2.6	-	-
20	56°24'	152°12'	12.4	9.0	0.8	2.6	-	-	-	-	-
21	56°30'	151°50'	3.7	1.9	0.4	1.4	-	-	-	-	-
22	56°25'	152°14'	7.2	4.5	0.4	2.3	-	-	-	-	-
23	56°32'	151°50	3.2	1.7	0.2	1.3	-	1	0.9	-	-
24	56°29'	152°04'	5.3	4.5	0.4	0.4	-	5	1.9	-	-
25	56°21'	152°17'	1.6	0.9	-	0.7	-	-	-	-	-
26	56°17'	152°54'	4.1	3.9	0.2	-	-	-	-	-	-
27	56°15'	152°45'	2.7	2.3	0.2	0.2	-	-	-	-	-
28	55°59'	153°27'	5.4	5.0	-	0.4	-	-	-	-	-
29	56°00'	153°26'	8.9	8.7	0.2	-	-	-	-	1	3.5
30	56°18'	153°13'	6.7	6.5	0.2	-	-	-	-	-	-
31	55°53'	153°47'	4.1	3.7	0.4	-	-	-	-	-	-
Total			168.9	149.8	6.8	12.1	0.2	53	99.5	14	60.8
June 1	55°53'	153°49'	6.8	6.2	0.4	0.2	-	-	-	-	-
2	58°00'	148°28'	8.7	8.7	-	-	-	-	-	-	-
3	57°54'	149°14'	4.0	4.0	-	-	-	-	-	-	-
4	57°56'	148°59'	12.7	11.4	0.9	0.4	-	-	-	-	-
5	57°58'	148°57'	3.2	3.2	-	-	-	-	-	-	-
6	57°57'	148°59'	18.1	17.9	0.2	-	-	-	-	-	-
7	57°57'	148°57'	13.6	13.2	0.4	-	-	-	-	-	-
8	58°00'	148°48'	10.4	10.4	-	-	-	-	-	-	-
9	57°58'	148°37'	10.8	10.4	0.4	-	-	-	-	-	-
10	57°59'	148°35'	12.3	11.8	0.5	-	-	-	-	-	-
11	58°12'	148°38'	6.5	6.5	-	-	-	-	-	-	-
12	58°02'	148°30'	14.8	14.8	-	-	-	-	-	-	-
13	58°13'	148°27'	13.4	13.4	-	-	-	-	-	-	-
14	58°06'	148°29'	15.0	14.8	0.2	-	-	-	-	-	-
15	58°19'	148°15'	15.5	14.8	0.4	0.3	-	-	-	1	5.5
16	58°18'	148°15'	23.0	22.3	0.2	0.5	-	-	-	-	-
17	58°17'	148°21'	14.3	14.1	0.2	-	-	-	-	-	-
18	58°24'	148°11'	9.9	9.3	0.4	0.2	-	-	-	-	-
19	58°29'	148°08'	13.4	13.4	-	-	-	-	-	-	-
20	58°34'	148°05'	16.2	16.2	-	-	-	-	-	-	-
21	58°36'	148°00'	12.8	12.8	-	-	-	-	-	-	-
22	58°35'	148°02'	12.9	12.9	-	-	-	-	-	-	-
23	58°36'	148°08'	8.3	8.1	0.2	-	-	-	-	-	-
24	58°34'	148°05'	10.5	10.5	-	-	-	-	-	-	-
25	58°38'	147°59'	15.5	15.3	-	0.2	-	-	-	-	-

(Table continued on next page.)

Table 2 - Daily Landings of the Seiju Maru No. 3 Fleet, April 24-September 20, 1963 (Contd.)

Date	Mothership Noon Position		Catch (Metric Tons)					Halibut[1]			
								Under 66 cm.		Over 66 cm.	
	Lat. N.	Long. W.	Total Catch	Sable-fish	Arrow-Tooth Flounder	Black Throat-Rockfish	Pacific Ocean Perch	Number	Avg. Wt. (Kg.)	Number	Avg. Wt. (Kg.)
June 26	58°37'	148°05'	15.4	15.4	-	-	-	-	-	-	-
27	58°31'	148°03'	14.5	14.5	-	-	-	-	-	-	-
28	58°32'	148°06'	10.2	10.0	-	0.2	-	-	-	-	-
29	58°34'	148°07'	2.0	2.0	-	-	-	-	-	-	-
30	58°22'	148°28'	16.7	15.1	-	1.6	-	-	-	2	22.8
Total			361.4	353.4	4.4	3.6	-	-	-	3	51.1
July 1	58°29'	148°17'	12.8	12.6	0.2	-	-	-	-	-	-
2	58°32'	148°10'	17.6	17.4	-	0.2	-	-	-	-	-
3	58°29'	148°07'	18.4	17.6	0.2	0.6	-	-	-	-	-
4	58°27'	148°14'	16.7	15.7	0.4	0.6	-	-	-	-	-
5	58°12'	148°35'	13.4	12.0	0.6	0.8	-	-	-	-	-
6	57°58'	148°55'	14.3	13.7	0.2	0.4	-	-	-	-	-
7	58°25'	148°57'	6.6	6.6	-	-	-	-	-	-	-
8	57°57'	148°41'	26.3	26.3	-	-	-	-	-	-	-
9	58°00'	148°45'	11.2	11.0	-	0.2	-	-	-	-	-
10	57°57'	148°55'	11.0	11.0	-	-	-	-	-	-	-
11	57°59'	149°02'	15.3	15.1	0.2	-	-	-	-	-	-
12	57°59'	149°02'	15.0	14.8	0.2	-	-	-	-	-	-
13	57°58'	149°01'	14.6	14.6	-	-	-	-	-	-	-
14	57°58'	148°50'	12.5	12.3	-	0.2	-	-	-	-	-
15	57°55'	149°04'	8.6	8.4	-	0.2	-	-	-	2	25.1
16	58°00'	148°34'	2.5	2.5	-	-	-	-	-	-	-
17	58°00'	148°34'	7.0	7.0	-	-	-	-	-	-	-
18	58°08'	148°40'	7.5	7.5	-	-	-	-	-	-	-
19	57°57'	149°00'	0.0	-	-	-	-	-	-	-	-
20	58°11'	148°45'	15.5	15.5	-	-	-	-	-	-	-
21	58°01'	148°55'	5.2	4.8	-	0.4	-	-	-	-	-
22	58°02'	148°45'	7.2	6.8	0.2	0.2	-	-	-	-	-
23	58°11'	148°39'	12.7	12.3	0.2	0.2	-	-	-	-	-
24	58°30'	148°26'	9.5	8.7	0.4	0.4	-	-	-	-	-
25	58°03'	149°30'	13.5	11.5	0.8	1.0	0.2	-	-	-	-
26	58°47'	148°07'	15.7	15.1	0.4	0.2	-	-	-	2	35.5
27	58°21'	148°28'	20.9	19.5	0.6	0.8	-	-	-	-	-
28	58°48'	148°03'	12.5	11.5	0.4	0.6	-	-	-	-	-
29	59°05'	147°53'	26.2	25.2	1.0	-	-	-	-	-	-
30	59°00'	147°50'	21.1	20.7	0.2	0.2	-	-	-	-	-
31	58°59'	147°29'	26.2	25.2	0.6	0.4	-	-	-	-	-
Total			417.5	402.9	6.8	7.6	0.2	0	0	4	121.2
Aug. 1	59°10'	147°41'	17.7	16.7	0.6	0.4	-	-	-	-	-
2	59°08'	147°43'	20.5	20.1	-	0.4	-	-	-	-	-
3	59°11'	147°21'	16.2	16.2	-	-	-	-	-	-	-
4	59°10'	147°14'	8.7	8.7	-	-	-	-	-	-	-
5	59°04'	147°35'	18.4	18.2	-	0.2	-	-	-	-	-
6	59°11'	147°22'	16.8	16.8	-	-	-	-	-	-	-
7	59°11'	147°05'	14.0	13.8	-	0.2	-	-	-	-	-
8	58°50'	147°51'	12.3	12.1	-	0.2	-	-	-	-	-
9	59°12'	146°57'	11.5	11.5	-	-	-	-	-	-	-
10	59°05'	147°41'	12.2	11.8	-	0.4	-	-	-	3	30.4
11	59°11'	147°02'	8.3	7.9	-	0.4	-	-	-	-	-
12	59°15'	146°30'	9.6	9.1	-	0.5	-	-	-	-	-
13	59°18'	146°14'	18.3	17.8	-	0.5	-	-	-	-	-
14	59°17'	146°02'	7.3	6.5	0.2	0.6	-	-	-	2	33.2
15	59°18'	146°19'	10.0	9.2	-	0.8	-	-	-	-	-
16	59°29'	145°44'	18.6	18.6	-	-	-	-	-	-	-
17	59°27'	145°28'	17.8	17.6	-	0.2	-	-	-	-	-
18	59°30'	145°20'	16.2	16.2	-	-	-	-	-	-	-
19	59°29'	145°30'	15.5	15.3	-	0.2	-	-	-	-	-
20	59°25'	145°25'	19.6	19.6	-	-	-	-	-	-	-
21	59°26'	145°23'	13.5	12.9	-	0.6	-	-	-	-	-
22	59°24'	145°30'	18.8	18.0	-	0.8	-	-	-	-	-
23	59°25'	145°22'	18.4	17.6	-	0.8	-	-	-	-	-
24	59°26'	145°21'	11.9	10.9	0.4	0.6	-	-	-	-	-
25	59°25'	145°23'	10.1	10.1	-	-	-	-	-	-	-
26	59°27'	145°24'	6.7	6.5	-	0.2	-	-	-	-	-

(Table continued on next page.)

Table 2 - Daily Landings of the Seiju Maru No. 3 Fleet, April 24-September 20, 1963 (Contd.)

Date	Mothership Noon Position		Catch (Metric Tons)					Halibut[1]			
								Under 66 cm.		Over 66 cm.	
	Lat. N.	Long. W.	Catch	Sable-fish	Arrow-Tooth Flounder	Black Throat-Rockfish	Pacific Ocean Perch	Num-ber	Avg. Wt. (Kg.)	Num-ber	Avg. Wt. (Kg.)
Aug. 27	59°15'	146°46'	11.9	11.7	0.2	-	-	-	-	-	-
28	59°11'	147°10'	16.4	16.0	0.2	0.2	-	-	-	-	-
29	59°00'	147°40'	18.1	18.1	-	-	-	-	-	-	-
30	59°01'	147°45'	11.0	11.0	-	-	-	-	-	-	-
31	58°59'	148°20'	10.3	10.3	-	-	-	-	-	1	4.5
Total			436.6	426.8	1.6	8.2	0.0	0	0	6	162.1
Sept. 1	58°44'	148°19'	14.2	14.2	-	-	-	-	-	-	-
2	58°40'	148°35'	12.6	12.6	-	-	-	-	-	1	39.3
3	58°40'	148°09'	5.4	5.4	-	-	-	-	-	-	-
4	58°30'	148°23'	20.1	19.1	0.2	0.8	-	-	-	-	-
5	58°30'	148°25'	14.3	14.3	-	-	-	-	-	-	-
6	58°14'	148°30'	2.2	2.2	-	-	-	-	-	-	-
7	58°15'	148°27'	2.1	1.9	0.2	-	-	-	-	-	-
8	58°10'	148°29'	15.9	15.5	0.4	-	-	-	-	-	-
9	58°03'	148°50'	10.7	10.7	-	-	-	-	-	-	-
10	57°48'	149°34'	5.6	5.0	-	0.6	-	-	-	-	-
11	57°48'	149°20'	11.5	11.5	-	-	-	-	-	-	-
12	57°49'	149°32'	13.8	13.4	0.4	-	-	-	-	-	-
13	57°41'	149°45'	8.0	7.8	0.2	-	-	-	-	-	-
14	57°41'	149°28'	4.7	4.5	0.2	-	-	-	-	-	-
15	57°40'	148°51'	6.5	5.7	0.8	-	-	-	-	-	-
16	56°16'	152°43'	1.1	1.1	-	-	-	-	-	-	-
17	55°50'	154°10'	1.7	1.7	-	-	-	-	-	-	-
18	55°54'	153°53'	6.8	6.8	-	-	-	-	-	-	-
19	55°52'	154°01'	7.8	7.8	-	-	-	-	-	-	-
20	55°50'	154°10'	6.4	6.4	-	-	-	-	-	-	-
Total			171.4	167.6	2.4	1.4	0.0	0	0	1	39.3
Grand Total			1,561.0	1,504.6	22.2	33.1	1.1	58	107.5	28	434.5

1/Halibut catches were classified according to length (under or over 66 cm. or 26 inches) at the request of the International Pacific Halibut Commission.

2. The total catch landed by a catcher boat was estimated visually by noting the number and fullness of fish-cargo nets transferred to the factoryship. A full net weighed about 1 metric ton.

3. The fish-processing officer aboard the factoryship made the final and most accurate estimate. He periodically sampled the catch by species for round and dressed weight to estimate the percentage discard (waste) per fish. He then was able to use the careful tally that was made of the number of pans of fish by weight and species going into the freezing room to estimate total round weight. His final figures were used as a check against the other two estimates.

DAILY LANDINGS: The daily landings in metric tons are given by species, and include the numbers and average weights of halibut (table 2). The reported total catch was 1,561 metric tons for April 24-September 20, 1963. Of that total, 542 kg. (1,000 kg. = 1 metric ton) or 0.03 percent of the total catch was halibut; except for the catch on May 4, halibut catches were less than 1 percent by weight of the daily landings. Sablefish contributed 1,504.6 metric tons, or 96.4 percent of the total catch. Blackthroat rockfish, arrowtooth flounder, and Pacific ocean perch followed in that order of importance.

CATCH BY STATISTICAL AREA: A summary of bottom-gill net catches by statistical areas (including the total catch, catch by major species, and catch per tan) is given in table 3. Twenty-seven statistical areas were fished between 145° W. and 168° W. longitude, in which a total of 1,070 strings of gear or 39,265 tans of gill net were set. Halibut were taken in 12 of the 27 statistical areas. The largest number of halibut, 56 fish, was taken in area 62540 and the largest weight of halibut, 178 kg., was taken in area 49583. The greatest amount of effort

Table 3 - Summary of Catches by Statistical Areas (Total Catch, Catch by Major Species, and Catch Per Tan)

Statistical Area	Total Tans Set	All Species		Sablefish		Arrowtooth Flounder		Blackthroat Rockfish[1]		Pacific Ocean Perch		Halibut			
												Catch			
		Total Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Total Wt.	Wt. Per Tan	Fish	Fish Per Tan
	No.	(Kilograms)										Kg.	Kg.	No.	No.
46590	2,400	110,200	45.92	106,800	44.50	400	0.17	3,000	1.25	-	-	-	-	-	-
46593	1,101	54,800	49.77	54,400	49.41	-	-	400	0.36	-	-	-	-	-	-
47590	1,787	68,991	38.61	65,700	36.77	200	0.11	3,000	1.68	-	-	91	.05	3	.00
48583	698	31,000	44.41	30,500	43.70	200	0.29	300	0.43	-	-	-	-	-	-
48590	4,563	245,205	53.74	241,500	52.93	2,000	0.44	1,700	0.37	-	-	5	.00	1	.00
48593	38	300	7.89	300	7.89	-	-	-	-	-	-	-	-	-	-
49573	2,963	126,350	42.64	122,300	41.28	1,800	0.61	2,000	0.67	200	0.07	50	.02	2	.00
49580	7,301	301,246	41.26	291,100	39.87	4,100	0.56	6,000	0.82	-	-	46	.01	2	.00
49583	3,058	130,478	42.67	126,900	41.50	1,100	0.36	2,300	0.75	-	-	178	.06	5	.00
50573	6,817	282,406	41.43	276,800	40.60	4,100	0.60	1,500	0.22	-	-	6	.00	1	.00
50590	40	3,600	90.00	3,600	90.00	-	-	-	-	-	-	-	-	-	-
52560	145	1,076	7.42	700	4.83	-	-	376	2.59	-	-	-	-	-	-
53560	2,756	75,163	27.27	60,665	22.01	3,684	1.34	10,796	3.92	2	0.00	16	.01	9	.00
54553	160	5,804	36.28	5,700	35.62	100	0.62	-	-	-	-	4	.02	1	.01
54560	1,176	33,502	28.49	31,400	26.70	1,000	0.85	1,100	0.94	-	-	2	.00	1	.00
55553	1,417	44,246	31.22	42,804	30.21	1,236	0.87	202	0.14	4	0.00	-	-	-	-
55560	35	4,400	125.71	4,400	125.71	-	-	-	-	-	-	-	-	-	-
59543	120	976	8.13	678	5.65	30	0.25	68	0.57	200	1.67	-	-	-	-
61540	330	4,068	12.33	3,660	11.09	400	1.21	8	0.02	-	-	-	-	-	-
62533	120	560	4.67	560	4.67	-	-	-	-	-	-	-	-	-	-
62540	1,160	16,726	14.42	15,409	13.28	863	0.74	295	0.25	23	0.02	136	.12	56	.05
62543	160	758	4.74	654	4.09	100	0.62	-	-	4	0.02	-	-	-	-
63533	55	857	15.58	821	14.93	23	0.42	10	0.18	-	-	3	.05	2	.04
63540	715	12,088	16.91	10,515	14.71	429	0.60	257	0.36	882	1.23	5	.01	3	.00
66530	90	626	6.96	200	2.22	208	2.31	100	1.11	118	1.31	-	-	-	-
67530	20	15	0.75	-	-	6	0.30	-	-	9	0.45	-	-	-	-
68530	40	55	1.38	3	0.08	6	0.15	-	-	46	1.15	-	-	-	-

1/Incidental catches of Sebastolobus sp. included.

and highest catch per tan were in statistical areas between 145° W. and 150° W. longitude. Sablefish dominated the catch in all but three areas.

CATCH BY DEPTH: Records of catches by 100-meter (328-foot) depth intervals (table 4) include the catch per tan of all species combined and of important individual species. Most fishing was between 600 and 800 meters (1,969 and 2,625 feet). Similarly, the greater portion of the total catch (over 66 percent) was taken in that depth interval. The catches per tan were high between 500 and 900 meters (1,804 and 2,953 feet). Halibut were distributed between 200 and 800 meters (656 and 2,625 feet) but were most common between 400 and 500 meters (1,312 and 1,804 feet). Sablefish were caught between 200 and 1,000 meters (656 and 3,281 feet) and catch per tan was highest between 500 and 900 meters (1,312 and 2,953 feet). Arrowtooth flounder and Pacific ocean perch both were abundant between 200 and 500 meters (656 and 1,804 feet), and catches of blackthroat rockfish were best between 300 and 600 meter (984 and 1,969 feet).

Table 4 - Summary of Catches by 100-Meter Depth Intervals (Total Catch, Catch by Major Species, and Catch Per Tan)

Depth (Meters)	Total Tans Set	All Species		Sablefish		Arrowtooth Flounder		Blackthroat Rockfish[1]		Pacific Ocean Perch		Halibut Catch			
		Total Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Total Wt.	Wt. Per Tan	Fish	Fish Per Tan
	No.	(Kilograms)										Kg.	Kg.	No.	No.
101- 200	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
201- 300	100	2,173	21.73	1,609	16.09	416	4.16	20	.20	60	.60	68	.68	2	.02
301- 400	1,181	37,068	31.39	29,285	24.80	2,240	1.90	4,492	3.80	977	.83	74	.06	4	.00
401- 500	3,043	97,041	31.89	83,148	27.32	4,008	1.32	9,183	3.02	447	.15	255	.08	61	.02
501- 600	5,481	221,596	40.43	208,760	38.09	4,392	.80	8,444	1.54	-	-	-	-	-	-
601- 700	12,594	518,135	41.14	507,197	40.27	5,804	.40	5,804	.46	4	0	65	.00	3	.00
701- 800	12,721	510,190	40.11	500,770	39.37	4,145	.33	5,269	.41	-	-	6	.00	2	.00
801- 900	3,495	139,619	39.95	139,000	39.77	419	.12	200	.06	-	-	-	-	-	-
900-1,000	70	1,900	27.14	1,900	27.14	-	-	-	-	-	-	-	-	-	-
No depth data	545	27,774	50.96	26,400	48.44	1,300	2.38	-	-	-	-	74	.14	14	.03

1/Incidental catches of Sebastolobus sp. included.

INCIDENTAL CATCH: The following species were taken incidentally in the bottom gill nets:

Painted greenling	Oxylebius pictus
Spiny dogfish	Squalus acanthias
Dover sole	Microstomus pacificus
Pacific cod	Gadus macrocephalus
Prowfish	Zaprora silenus
Flag rockfish	Sebastodes rubrivinctus
Shortspine channel rockfish	Sebastolobus alascanus
Longspine channel rockfish	Sebastolobus altivilus
Salmon shark	Lamna ditropis
Pacific sleeper shark	Somniosus pacificus
Skate	Family Radjidae
Walleye pollock	Theragra chalcogrammus
Grenadiers	Family Macruridae
Tanner crab	Chionoecetes sp.
_____	Anotopterus pharae

BIOLOGICAL OBSERVATIONS: Biological data were collected on halibut, sablefish, blackthroat rockfish, and arrowtooth flounder. "Complete" biological records included length, weight, sex, maturity, and stomach contents. In addition, otolith samples, for age determination, were collected from halibut; scale samples were also collected from sablefish in May through July.

Biological data on halibut were transmitted to the International Pacific Halibut Commission.

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REDUCTION PROCESS TO CONVERT RAW FISH INTO THIAMINASE-FREE PRESS CAKE

By R. H. Gnaedinger*

ABSTRACT

Described is a reduction process designed to increase the use of rough fish in conjunction with relatively small fishing operations. Freshly caught fish are processed into press cake, yielding oil and stickwater as byproducts. In the process, fish are heated with live steam to a relatively high temperature in minimum time. Subsequent pressing of the cooked material yields a cake with several useful characteristics. It is in a form that is easy to handle and requires only one-half the storage space of whole fish. It is a valuable feed supplement, owing to its high protein and mineral content, and is safe to feed because it is not thiaminase-active. Consumer acceptance is increased by its uniform composition. The press cake apparently is readily eaten by mink.

INTRODUCTION

The species composition of fish in the Great Lakes has changed gradually over the years. The food fish of high value have almost disappeared (Brouillard 1960) and have been replaced by less desirable species (alewife, "bloater" chub, and smelt) which have not been used extensively for human food. Because these lower-value species have become highly abundant, or nearly the only fish available, the fishing industry has declined to a point where, to remain vital, it must adopt new or improved products and processes to use its fish profitably.

The pet-food industry uses large amounts of raw fish (Jones 1960), but that market frequently becomes glutted. It could possibly absorb larger quantities, however, if the fish were offered in a uniformly processed, stable form. A significant and large market for fish as mink food has also been established (Jones 1960). Its further development also depends upon products, other than raw fish, that the fur-farming industry can use regularly. Although raw fish is generally regarded as an excellent food supplement for animals, mink ranchers do not always accept it routinely for several reasons. The proximate composition of fish often varies seasonally, which necessitates constant changes in ration formulation. Supplies of fresh fish are not regularly available, owing to the seasonal nature of the fishery. Frozen fish (fresh fish is frozen during glut periods for subsequent use) undergo a gradual lowering of quality during storage. Cooking of the thiaminase-active fish by current methods often lowers the quality of even fresh fish.

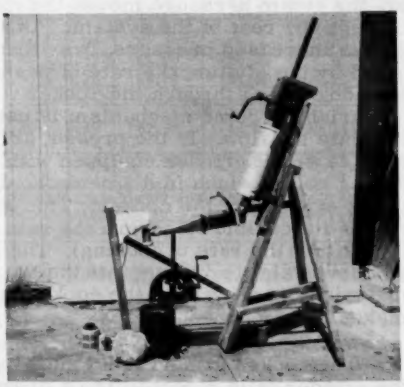

Fig. 1 - Experimental equipment used to convert raw fish into thiaminase-free press cake.

Small fisheries, including most of those in the Great Lakes Area, are gravely handicapped because they lack adequate processing methods to convert raw fish into salable processed products. Much of the potential market therefore is closed to them.

This paper describes a reduction process (developed at this laboratory under the process-product development studies on thiaminase-active fish) to convert raw fish into a cooked product that is (1) thiaminase-free, (2) relatively uniform in proximate composition, and (3) apparently suitable as a supplement to rations for mink and other animals. The process, designed to be low-cost and adaptable to any scale of operation, was intended primarily for the production of mink-feed supplements. It is likely, however, that the product can be used to supplement other feeds, like cat and poultry rations. The process, the product, and potential commercial adaptation are described.

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DESCRIPTION OF PROCESS

The process involves heating ground fish with live steam to a relatively high temperature in minimum time. Subsequent pressing of the cooked material at relatively low pressures yields a "cake" with much of the original water and oil removed. The process also yields press liquor, which can be further processed into salable byproducts, thereby defraying part of the cost of operation.

The equipment consists of (1) a grinder; (2) a stuffer, which serves as a means to force the ground material into the cooker; (3) a cooker; (4) a second grinder, which serves as a means of regulating the flow of material through the cooker; and (5) a press (fig. 2). The process is designed for continuous cooking followed by batch pressing.

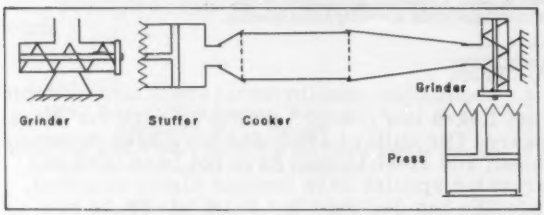

Fig. 2 - Schematic representation of the reduction process.

The raw fish are first ground through a $\frac{1}{4}$-inch plate, and then transferred to a sausage stuffer, which in turn is used to feed the cooker. In the laboratory model, the two operations were done separately, but they could be combined simply by connecting the grinder to the cooker.

The cooker (fig. 3) has a distance of $\frac{1}{2}$-inch between the two metal steam plates. The holes in the plates ($\frac{1}{32}$-inch diameter) are positioned so that jets of steam can be delivered uniformly to both sides of the ground material as it passes through the cooker. Under this arrangement, the ground material, through direct contact with live steam, can be heated quickly to a relatively high temperature. Injection of steam in this manner actually serves three purposes: it cooks the material rapidly; it facilitates the movement of the material through the cooker; it aides in the extraction of oil from the cooked fish.

Once the raw ground fish enters the cooker, the steam pressure moves the material through the rest of the system. As a result of this increased pressure, over that provided by the stuffer, the rate of passage of the cooked fish through the cooker tends to be variable. Some mechanism is needed to regulate the flow. In the present arrangement, a small grinder equipped with a plate having holes $\frac{1}{2}$-inch in diameter is affixed to the exit end of the cooker. This addition makes it possible to govern the rate of flow (and in turn the rate of cooking). The grinder serves also to disintegrate the coagulated material emerging from the cooker and thus makes a homogeneous mass.

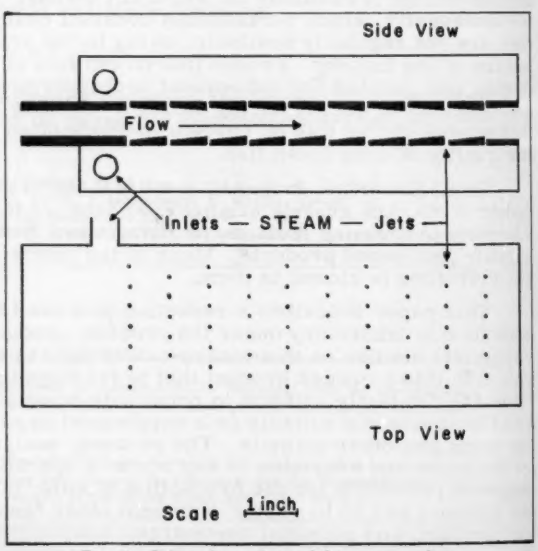

Fig. 3 - Side and top views of the steam cooker.

The cooked ground fish emerging from the grinder falls directly into a press cage and is pressed for 5 minutes at a pressure of 10 to 15 pounds per square inch. The cage, constructed of $\frac{1}{16}$-inch brass, is insulated to minimize loss of heat during filling and pressing. The pressed material, which is in the form of a cake, is packed in plastic bags and is allowed to cool at room temperature for about 1 hour before being plate-frozen. Immediate packaging of the hot material minimizes contamination of the product during subsequent handling. In the present

study, the temperature of the cake was measured immediately after pressing. Depending upon the quality of the raw fish, the yield of press cake was about 50 to 60 percent of the quantity of raw fish used.

DESCRIPTION OF PRODUCT

To determine the suitability of this process as a potentially useful reduction method, the press-cake products from different species of fish were evaluated from the standpoint of uniformity, residual thiaminase activity, and acceptability by animals.

The table gives the proximate composition of various lots of fresh fish and of their respective cooked products. The results show that raw fish of widely different proximate composition can be rendered into a relatively uniform product. As would be expected, the water and oil contents were decreased while the ash and protein contents were increased. For all species tested, the concentration of water in the raw fish ranged from 61 to 82 percent; whereas, that of the cooked products ranged from 61 to 71 percent. The concentration of oil varied from 2.3 to 22.3 percent in the raw fish; whereas, in the cooked material, the range was 4.1 to 10.1 percent. Thus, the water and oil ranges were reduced considerably in the cooked products. The amounts of oil and water removed during the cooking and pressing processes were directly proportional to the amounts initially present in the raw fish. For example, only a very small amount of oil was removed from smelt; in fact, the cooked material contained more (on a percentage basis) than did the raw fish. In contrast, a very high proportion of the initial amount of oil in carp was removed during processing. In all cases, the concentration of protein and ash increased in the press cake. This increase resulted, of course, from the removal of water and oil, but the data also indicate that no excessive amounts of protein and

Data Relating to Proximate Composition of Certain Fish Before and After Being Processed

Species 1/	Data on Capture		Proximate Composition of:							
			Raw Fish				Press Cake			
	Date	Location	Moisture	Protein	Oil	Ash	Moisture	Protein	Oil	Ash
			(Percentage)							
Alewife	7/6/64	Lake Michigan	72.16	12.04	12.64	2.57	64.30	19.52	7.80	4.71
	9/9/64		74.31	12.75	12.35	2.75	67.30	17.64	8.02	4.17
	9/30/64		74.90	11.99	8.60	2.73	66.96	18.10	7.14	4.70
	10/22/64		72.16	12.11	10.71	2.73	68.29	17.14	7.36	4.03
Carp	3/25/64	Lake Erie	64.4	-	16.2	-	63.1	-	7.1	-
	5/20/64		61.05	-	20.51	2.94	61.43	-	9.83	5.99
"Bloater" chub	7/-/64	Lake Michigan	69.13	12.76	14.56	2.17	65.29	20.45	7.65	3.68
Gulf fish	7/19/64	Gulf of Mexico	73.87	14.56	4.50	4.26	63.73	21.80	4.22	6.14
Gizzard shad	1/-/64	Arkansas	72.44	13.74	11.90	2.70	62.47	21.64	8.52	5.84
Gizzard shad:										
(5.8 fish/lb.)	10/28/64	Lake Erie	62.67	12.09	22.25	2.19	62.98	18.67	10.11	3.53
(36.5 fish/lb.)			70.58	12.01	14.16	2.24	-	-	-	-
American smelt	6/29/64	Lake Superior	81.57	11.85	2.34	1.99	70.90	18.04	4.13	3.13
	10/28/64	Lake Erie	75.54	12.71	7.60	2.01	68.87	18.79	6.35	2.70

1/Alewife, Pomolobus pseudoharengus; carp, Cyrinus carpio; "bloater" chub, Coregonus hoyi; gizzard shad, Dorosoma cepedianum; American smelt, Osmerus mordax; Gulf of Mexico fish, mixture of king whiting (Menticirrhus americanus), cutlassfish (Trichiurus lepturus), spot (Leiostomus nothus), croaker (Micropogon undulatus), sea robin (Pronotus sp.).

minerals are lost in the process. The composition of a typical sample of stickwater was as follows: 95.2 percent water, 0.3 percent oil, 0.8 percent protein, and 3.4 percent ash. In general, the variation in protein and in ash of the raw and cooked products was about the same, but their concentrations (on a percentage basis) were much higher in the press cake, approximately 50 percent and 70 percent, respectively.

The press-cake products were analyzed for residual thiaminase activity by the chemical method of Gnaedinger (1964). Cakes that had a temperature of 180° F. or above after being pressed were not thiaminase-active. Cakes that did not reach that temperature after pressing were usually thiaminase-active.

The most critical evaluation of the product lies in its acceptance by the animals for which it is intended. Consequently, a sample of alewife press cake was tested for palatability by mink at the U. S. Department of Agriculture Fur Animal Experiment Station at Cornell University. Twenty male mink were divided into two equal groups; each group was fed for 3 days

on either a test- or a control-diet at a rate of 225 grams of feed per day. After 3 days, and after each succeeding 3 day-period for a total period of 12 days, the diets were reversed. The test diet was formulated by replacing the fish of the control diet with alewife press cake. The control diet was that normally used at the Cornell Station for maintenance, and it contained 30 percent by weight of fish. At the end of the 12-day feeding period, the animals had refused 622 grams of the control diet and 448 grams of the test diet. Thus, acceptability appeared to favor the press cake in this test with alewife.

These promising results led to a study of the effects of the press cake on growth and reproduction, which started in June 1964 in cooperation with the Cornell Station. Twenty male and 20 female weaned mink kits were put on an experimental diet containing 30 percent by weight of alewife press cake. A statistical analysis will be made to determine the effects of the experimental diet on growth, fur quality, and reproduction. The results of this study as well as the results of a chemical evaluation of the press cake will be reported later.

POTENTIAL COMMERCIAL ADAPTATION

The equipment used in the present pilot study was relatively small. Because of this physical limitation, it was difficult to determine precisely the optimum conditions for a larger-scale operation. The steam for cooking was generated by an electric autoclave, but that device did not have the capacity to maintain a desired head of pressure (5 to 10 p.s.i.). As a result, the maximum possible rate of flow was limited to about 1.5 to 2 pounds of fish per minute. The cooker, even though small, could have handled larger amounts if adequate steam pressure could have been maintained.

The greatest difficulty was in the design and construction of the cooker, which was intended originally to function under continuous pressure. It proved difficult, however, to cook under pressure and at the same time to maintain a uniform and constant flow of material. The small grinder attached to the terminal end of the cooker partially solved the problem, which made it possible to vary the speed of the auger and to obtain the desired pressure and rate of flow. But, even this final arrangement did not entirely eliminate the variable flow of the cooked material, so the steam pressure tended to vary correspondingly.

Batch pressing was preferred for several reasons in addition to its low cost and lower capacity. The cooked material could be pressed and molded into a form convenient for subsequent handling, freezing, and storing. The inactivation of the enzyme thiaminase is a function of time as well as temperature; thus, pressing the cooked material into a cake maintains its maximum temperature over a longer period of time which aids in the destruction of the enzyme. This time-temperature relation applies to the destruction of other enzymes and of bacteria as well.

Several general observations were made regarding the conditions that influenced the cooking process and the effect of certain variables on the composition of the press cake. The temperature attained in the cooked material is important because the compressibility, and in turn the amount of water and oil expressible, is directly proportional to the temperature attained. In general, a minimum product temperature of 180° F. is required to effect satisfactory pressing and to destroy thiaminase. Further, fish that are partially decomposed and those that are frozen and then thawed appear to cook more rapidly than fresh fish. (Fresh fish, however, give the highest yields and the highest quality products). Highly viscous preparations appear to cook faster and are more easily handled than slurries. The pressure applied during pressing affects the composition of the press cake; that is, higher pressures simply remove more water and oil. If the starting temperature of the fish is low, the rate of cooking has to be decreased correspondingly. Other variables, such as particle size, thickness of the fish layer, number of steam jets, and steam pressure, all influence the rate of cooking. Those variables were not investigated in the present study. The reduction unit is currently being scaled up to pilot-production size so that a more thorough evaluation of the entire process can be made.

CONCLUSIONS

Fish can be cooked very rapidly with live steam by extruding the ground material into a thin layer and forcing it between a series of steam jets. The cooked material can then be pressed relatively uniform in proximate composition under low pressure; the loss of protein and mineral matter is small. A temperature of at least 180° F. is required to effect satisfactory pressing and to inactivate the enzyme thiaminase. The resulting "press-cake" product, which was made from alewife in this study, is readily consumed by mink.

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HISTORY OF SPICED AND PICKLED FISHERY PRODUCTS

Pickling with vinegar and spices is a very ancient form of food preservation, going back to prehistoric times. Stevenson (1899) believes that it probably antedates even pickling with salt. It is mentioned frequently in the writings of the Greeks and Romans, as witnessed by the citations of Smidth (1873) and Radcliffe (1921) in their accounts of the fisheries of the ancients. Certain fishery products prepared with vinegar and spices were considered great delicacies, selling at such high prices that they were reserved for the banquet tables of the rich. One dish popular in Spain and in the Latin American republics of Central and South America today is "escabeche." It is prepared by frying fish in oil with bay leaves and spices, then marinating in vinegar and oil. This dish can be traced directly to the Romans, who in turn had it from the Greeks.

Pickling with vinegar was used extensively down through the Middle Ages, especially for fish that were fat and did not cure well by the very crude salting methods of the times. While the product did not keep so long, it was more appetizing than the dried and salted products of the period. Vinegar-pickled fish played a very important part in the food economy of the north European people down through the seventeenth century.

Brine-salted fish is often called "pickled," but this is a misnomer, if the name as applied to other food products is considered. Pickled foods are fermented in the process of manufacture with the formation of organic acids. If the amount of organic acids formed is not sufficient, more acid may be added in the form of vinegar; or vinegar may be used in the original cure instead of depending on the natural formation of acid. Therefore, only fish preserved with vinegar or vinegar and spices should be considered pickled.

--Excerpted from:
Spiced and Pickled Seafoods, F. L. 554, U. S. Bureau of Commercial Fisheries, Washington, D. C.

Fishery Technology Developments

TECHNICAL NOTE NO. 1--A RAPID FIELD METHOD FOR DETERMINING THE SALT CONCENTRATION IN FRESH AND SMOKED CHUB

By R. A. Greig* and H. L. Seagran**

ABSTRACT

A rapid, simple field method for determining the concentration of salt (NaCl) in fresh and smoked chub is described. The method uses an inexpensive plastic indicator device sensitive to chlorides in solution. Results obtained by the field method were compared with those obtained by use of a chemical method known to be accurate. On the basis of these comparisons, the field method was found to be sufficiently accurate for practical purposes.

INTRODUCTION

The interim smoked-fish guidelines published late in 1963 by the U. S. Food and Drug Administration called attention to the need for significant changes in existing industry procedures for smoking fish. The results of subsequent industry efforts indicated that an immediate and extreme transition in smoking techniques would make it difficult to produce a fully marketable product (Patashnik, Lee, Seagran, and Sanford 1964). Despite this practical difficulty, however, findings by various researchers since the publication of the smoked-fish guidelines suggest that the interim-thermal-process requirements set forth in the guidelines may be inadequate to ensure the complete destruction of all Clostridium botulinum Type E spores that potentially may be associated with raw fish before it is heat-processed. As a result, various research and regulatory groups have examined additional or complementary processing techniques that hold promise of providing industry and consumer protection.

Some agencies have proposed that significantly increasing the salt content of the smoked product may complement thermal processing without altering the marketability of the product. Wisconsin (McDowell 1964) has already amended its regulations to require 5-percent salt in the water phase of the finished product in order to restrict the growth of any botulinum spores surviving the heat treatment. The salt content, however, would have to be controlled within rather narrow limits because of the microbiological hazard if the salt content is too low or of the unpalatability if the salt content is too high. The salt content has been difficult for the smoked fish industry to control closely because of the variability in rate of salt uptake by the fish during brining. A need therefore exists for a rapid method of accurately estimating the concentration of salt in a product during the various steps of processing. Unfortunately, laboratory methods for determining the salt content of fish are time consuming and usually require a technician to perform the tests.

The purpose of this study was to determine if existing quality-control methods employing simple indicator devices that have been used successfully by other industries could be

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applied to the accurate measurement of the concentration of salt in chub (1) during the brining procedure, to guide processors; and (2) in the final smoked product, to determine compliance with microbiological safety requirements.

In the first part of this paper, tests made to determine the suitability of a proposed rapid, simple field method for measuring salt concentration are reported; in the second, the proposed method (having been found adequate) is described in detail.

TESTS OF THE PROPOSED METHOD

MATERIALS FOR TESTING: Chub (Coregonus hoyi) from Lake Michigan were brined in various concentrations of salt to obtain products possessing a wide range of salt contents. Half of the brined chub at each salt level was smoked in a laboratory controlled smokehouse, and the remainder of each lot was left in the fresh-brined condition. Skin-on loins from the fresh brined chub and skinless loins from the smoked chub were used as material for determining salt concentration.

Table 1 - Salt Content of Brined Fresh Chub as Determined by a Method Employing an Indicator Device and by the A.O.A.C. Method 1/

Salt Content by Indicator Device, Employing Manual Extraction 2/	Salt Content by A.O.A.C. Method	Salt Content by Indicator Device, Employing Mechanical Extraction 3/	Salt Content by A.O.A.C. Method
Percent	Percent	Percent	Percent
0.56	0.56	0.69	0.64
1.2	1.18	1.5	1.45
1.5	1.57	1.7	1.93
1.8	1.79	2.6	2.56
3.1	3.43	3.6	3.80
3.7	3.98	3.7	4.23
4.1	4.43	-	-

1/From one homogeneous fish sample (corresponding to the various salt levels), separate weight aliquots were taken for the A.O.A.C. and indicator device methods.
2/Hot water and fish mixed with stirring rod.
3/Hot water and fish mixed with electric blender.

Table 2 - Salt Content of Brined Smoked Chub as Determined by a Method Employing an Indicator Device and by the A.O.A.C. Method 1/

Salt Content by Indicator Device, Employing Manual Extraction 2/	Salt Content by Indicator Device, Employing Mechanical Extraction 3/	Salt Content by A.O.A.C. Method
Percent	Percent	Percent
0.80	0.80	0.82
1.3	1.5	1.41
1.4	1.4	1.61
1.6	-	1.69
1.7	-	1.94
2.0	1.9	2.06
2.1	-	2.19
3.3	3.2	3.29
3.5	3.7	3.57
3.6	-	3.92
4.3	4.4	4.23
5.2	-	5.32
6.3	6.0	5.99
5.7	-	6.16

1/From one homogeneous fish sample (corresponding to the various salt levels), separate weight aliquots were taken for the A.O.A.C. and indicator device methods.
2/Hot water and fish mixed with stirring rod.
3/Hot water and fish mixed with electric blender.

TESTING PROCEDURES: An indicator device 1/ used in quality-control procedures by other industries was used. The indicator is a commercially available plastic strip containing a sensitized capillary element (fig. 1).

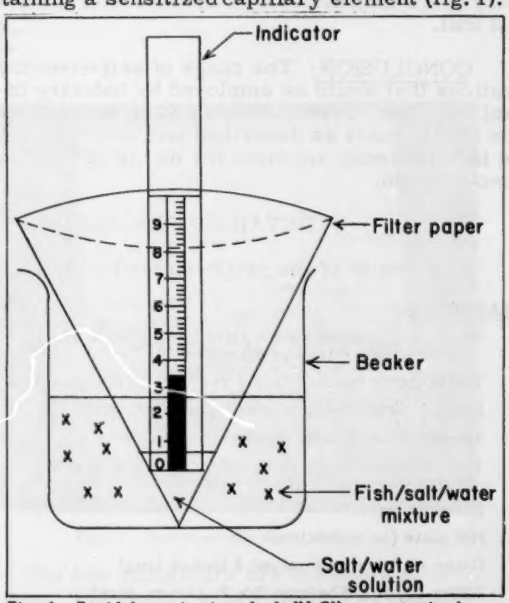

Fig. 1 - Rapid determination of salt (NaCl) concentration by a direct-reading method, showing placement of indicator inside the filter paper cone.

The indicator device, which is discarded after a single measurement, was employed as follows: 100 milliliters of boiling distilled water were added to 10 grams of well-mixed fish product. The mixture was stirred immediately, either manually with a stirring rod for 2 to 3 minutes or with an electric blender for 1 minute. Following the filtration of the fish mix-

1/Quantab, type S041; Ames Co., Elkhart, Indiana. (Trade names referred to in this publication do not imply endorsement of commercial products.)

ture, the indicator device was placed in a small portion of the filtrate. The percentage of salt was obtained from a standard curve (supplied by the manufacturer of the indicating device), which relates indicator-scale readings (on a semilog basis) to the concentration of salt in the filtered solution.

For comparison, salt concentration (by chloride analysis) was determined on replicate samples of the well-mixed fish product by the official methods of analysis of the Association of Official Agricultural Chemists (A.O.A.C.) (1960) to determine the accuracy of the indicator-test procedure.

RESULTS: Accuracy of the Indicator Test: Salt-concentration data (averages of duplicate determinations) resulting from the comparative tests employing both brined fresh chub (table 1) and brined smoked chub (table 2) show that the results using the indicator device correlated well with those obtained with the A.O.A.C. method.

With the brined fresh chub, 11 of the 13 values (85 percent) obtained with the indicator device were within 10 percent of the values obtained by the A. O. A. C. method. The other two values were within 14 percent of those of the reference method. With the brined and smoked chub, 12 of the 14 values (85 percent) obtained with the indicator device were within 8 percent of the values obtained by the A. O. A. C. method. The other two values were within 13 percent of those of the reference method. Further, over 85 percent of the values obtained (24 of the 27) were either the same as, or less than, the values obtained with the A. O. A. C. method.

Reproducibility of the Indicator Test: Over 75 percent of the duplicate readings did not vary more than 0.1 unit on the indicator-device scale; the greatest variation observed was 0.3 unit.

CONCLUSION: The range of salt-concentration data presented includes those concentrations that would be employed by industry in keeping both with public safety and with palatability. The results obtained when the indicator-test procedure was used show that, when the test is made as described and with the care described below, this simple and rapid method is sufficiently accurate for use in estimating the concentration of salt in both fresh and smoked chub.

DETAILED DESCRIPTION OF THE PROPOSED METHOD

The details of the proposed method are as follows:

MATERIALS:

- Small food grinder with a plate having holes approximately $\frac{1}{4}$ inch in diameter
- Triple-beam balance (scale readings to 0.1 gram)
- 250-ml. beakers (or $\frac{1}{2}$-pint, wide-mouth jars)
- 100-ml. wide-mouth, graduated cylinder
- 1500-ml. erlenmyer flask (for the boiling of distilled water)
- Distilled water
- Hot plate (or equivalent)
- Glass stirring rods (about 8 inches long)
- Filter paper (Whatman No. 2, 12-cm. size)
- Plastic bags (about 8 by 12 inches)
- Indicator devices

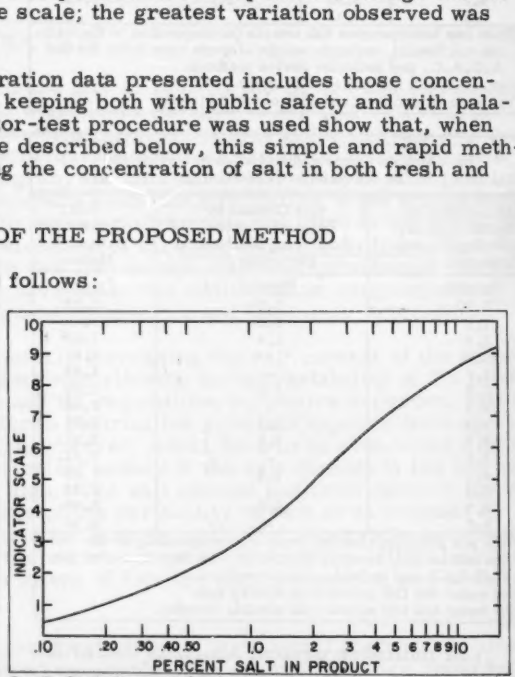

Fig. 2 - Standard curve employed in converting indicator scale reading directly to concentration of salt in product.

PROCEDURE:

1. Grind the skinless loin portion 2/ from smoked chub (or the skin-on loin portion from unsmoked chub, depending on the material to be analyzed) through the food grinder at least two times.

2/Results of recent unpublished work by this laboratory indicates that, for smoked chub, the proper portion of the product to be taken for salt determinations is the loin muscle (the thick meaty part adjacent to the backbone, rather than the meat adjacent to the ribcage). This portion of the fish will contain the minimum salt concentration and maximum moisture and is therefore that part most likely to support the growth of C. botulinum.

2. Place the ground sample in a plastic bag and mix well by kneading the bag.

3. Place 10 grams (accurately weighed to ± 0.1 gram) of the ground fish in a clean, 250-ml. beaker (or ½-pint wide-mouth jar).

4. Add 100 ml. of boiling distilled water to the 10 grams of fish.

5. Mix the fish and water thoroughly with a stirring rod for 2 to 3 minutes, carefully breaking apart any lumps.

6. Fold the filter paper into a cone shape and insert it, pointed end first, into the mixture of fish and water (fig. 1).

7. After a sufficient amount of water passes through the filter paper to wet the bottom of the indicator device, insert the device into the filtered solution. (The indicator device can be read after about 5 minutes. A marker area at the top of the device turns dark blue to indicate when a reading can be taken. The device contains a printed scale, which is calibrated from 0 to 10).

8. Accurately note the scale reading.

9. Find this number on the indicator scale of the standard curve employed in converting the indicator-scale readings directly to salt content of product (fig. 2).

10. Draw a horizontal line from the number on the indicator scale to intersect the curve.

11. At this point of intersection, draw a vertical line to intersect the percent-salt-in-product scale.

12. Record this value as being the percentage of salt in the product.

Note: The salt concentration determined with the standard curve supplied by the manufacturer of the indicator device must be multiplied by 10 to give the salt content of the fish product. This factor has been incorporated in the scale of figure 2.

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Transportation and Marketing Aid

NEW PLASTIC FISH BOXES TO AID FRESH FISH MARKETING:

A new lightweight re-usable plastic fish box for transporting fresh and frozen fish has been developed by a firm in Seattle, Wash. A high-density polyethylene material is used in the new boxes to make them tough and flexible. You can jump on them at 40 degrees below zero without cracking them. They will also withstand steam-cleaning heat.

Particularly adaptable to air shipment, the new containers may offer an excellent opportunity to expand fresh fish markets. The weight of the polyethylene containers is about half that of fiberglass, and they have been approved for re-use by the U. S. Food and Drug Administration. By August 1965, over 2,000 of the new boxes had been sold or leased to 2 airlines based in Seattle, and other airlines were testing the boxes. Using the new containers, an airline transported over 500 tons of fresh fish from Alaska to Seattle during June and July 1965 without a claim for spoiled or damaged fish. In September 1965, an airline announced a one-year experimental rate reduction of 40 percent on Northwest fishery shipments to eastern points.

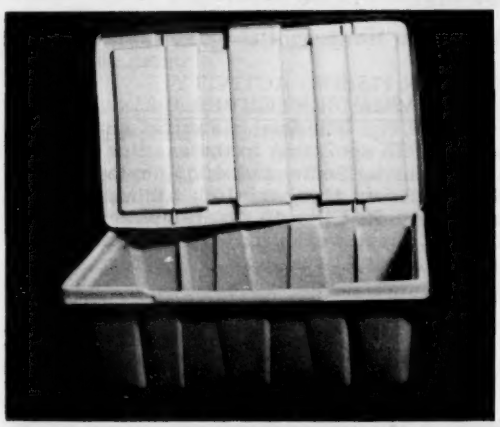

Fig. 1 - New re-usable plastic fish box.

The new containers are available in two sizes. The larger size will hold 250 to 300 pounds of fresh fish and has outside dimensions of $41\frac{3}{4}$ x $21\frac{3}{4}$ x 18 inches. The smaller size holds 125 to 175 pounds of fresh fish and has outside dimensions of 32 x 20 x 11 inches. Minimum monthly lease costs are said to be 68 cents a box for the larger size and 50 cents a box for the smaller size.

Fig. 2 - Bale-reinforced lid for plastic box gives added strength.

The new boxes are vacuum formed. Strength and rigidity are provided through structural ribbing and bale-reinforced lid. The boxes can be stacked when full and nested when empty.

Notes: (1) Additional information is available from the Marketing Office, U.S. Bureau of Commercial Fisheries, 2725 Montlake Blvd. East, Seattle, Wash.

(2) See page 44 of this issue for a report on an airline's reduced rates for Northwest fishery shipments to eastern points.

Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, SEPTEMBER 1965:

U.S.S.R.: The Soviet Pacific ocean perch trawl fleets operating in the eastern Gulf of Alaska during September 1965 deployed their fishing efforts along the 100-fathom curve from Cape St. Elias to Dixon Entrance. For the first three weeks in September one major fleet of about 41 trawlers, 10 reefers, 1 factoryship, and 1 tanker operated off Yakutat.

Fig. 1 - Soviet trawler transferring Pacific ocean perch to reefer vessel in Gulf of Alaska.

The second fleet of about 27 trawlers, 5 reefers, 1 tug, and 1 cargo vessel was dispersed between Cape Spencer and Cape Ommaney. Those two major fleets gradually moved south along the coast of Alaska and by the end of the month both fleets had merged into one concentration off Dixon Entrance.

Fig. 2 - Soviet salvage tug.

The Soviet trawl fishery in the central and western Aleutians remained fairly stable throughout September. The fishery in the central Aleutians, composed of 12 trawlers and 3 reefers, remained relatively fixed in the vicinity of Amukta Pass during the month.

In the western Aleutians there was a major concentration of Soviet vessels made up of 16 BMRT factory trawlers, 2 SRT trawlers, 2 reefers, and intermittent support vessels. A notable increase in the size of that fleet occurred during September.

Fig. 3 - Soviet whale factoryship Vladivostok in western Gulf of Alaska.

The two Soviet SRT-M trawlers engaged in shrimp fishing east of the Shumagin Islands ceased operations during the second week of September. It was not known whether those trawlers returned to their home port or were transferred to another fishery.

During September the Soviet whale factoryships Dalniy Vostok and Aleut, each accompanied by 9 whale killer vessels, were operating south of the Aleutian Islands between Adak and Attu. The whale factoryship Vladivostok and its fleet worked in the western Gulf of Alaska during the first week of September. That vessel gradually moved westward and by the end of the month was

working in the Bering Sea north of Semisopochnoi Island.

Japan: During the first week of September, the Japanese vessels Taiyo Maru No. 37, Takachiko Maru, Takachi Maru, and Fukuho Maru No. 2, trawled east of the Trinity Islands; and were joined by the Akebono Maru No. 53. The Daishin Maru No. 12 and the Fukushin Maru No. 1 trawled on Portlock Bank south of Middleton Island throughout the month. The second week of September the Akebono Maru No. 53 moved from Albatross to Portlock Bank and fished in the same general area as the Daishin Maru No. 12. The stern trawler Akebono Maru No. 71 continued to fish in the central Aleutians in the vicinity of Amukta Pass.

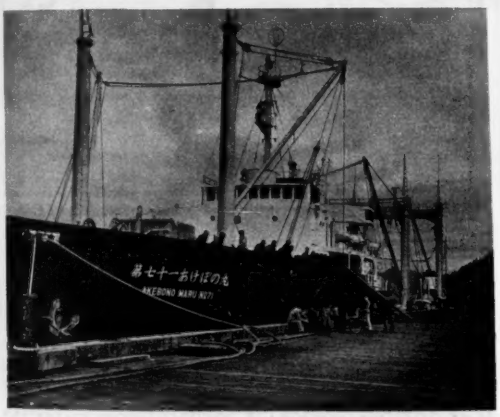

Fig. 4 - Japanese stern trawler Akebono Maru No. 71.

In early September the Chichibu Maru and 8 accompanying trawlers returned to the western Aleutians. She fished for Pacific ocean perch in the area around Amchitka Pass until mid-September when she moved to north of the Pribilof Islands and began fishing for shrimp

Late in September the factory trawlers Aso Maru, Akebono Maru No. 72, and Tenyo Maru No. 3 arrived in the area east of Buldir Island in the western Aleutians. Those vessels were presumably fishing for Pacific ocean perch.

The Japanese fish meal factoryships Gyokuei Maru, Hoyo Maru, and Tenyo Maru continued to fish on the grounds north of the Pribilofs during early September. The Gyokuei Maru and Hoyo Maru, accompanied by

Fig. 5 - Japanese fish meal factoryship Tenyo Maru.

26 and 29 trawlers, respectively, ended operations in mid-September and returned to Japan. The Tenyo Maru and her 10 trawlers remained on the grounds throughout the remainder of the month.

Another Japanese fish meal factoryship, the Shikishima Maru, accompanied by 23 trawlers, arrived in the western Aleutians during the first week of September. She fished in the region east of Attu Island and Amchitka Pass until about September 20 when she presumably returned to Japan.

Fig. 6 - Japanese trawler fishing north of the Pribilofs for the fish meal factoryship Gyokuei Maru.

Throughout September the shrimp factoryship Einen Maru and her 15 trawlers fished in the area about 100 miles north of St. Paul Island. That fleet had been fishing for shrimp in that area since late April 1965.

About the end of the month two Japanese long-line vessels were fishing in the Gulf of Alaska. The Kiku Maru No. 25 was sighted about 25 to 30 miles west of Middleton Island during the second week of September and remained in the Gulf until the end of that month. A second Japanese long-line vessel (IG 1-189) was seen on September 23 south of the Trinity Islands.

The Japanese whale factoryships Nitto Maru and Kyokuyo Maru, each accompanied by 7 catcher boats were reportedly operating in the western Aleutians during the entire month of September.

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NEW FISH PROCESSING PLANT AT HOMER: The Homer city council has granted a year's option on about two acres of city-owned land to an Alaska fish-processing firm. The land lies on the Kachemak Bay side of Homer Spit next to the Homer city dock. Initially the plant will handle salmon, halibut, shrimp, and king and Dungeness crab. The anticipated annual capacity will be about 20.5 million pounds. If the first stage proves successful, the firm will then begin processing scallops, herring, and clams.

Alaska Fisheries Explorations and Gear Development

SHRIMP AND BOTTOMFISH RESOURCES OFF SOUTHEAST ALASKA SURVEYED: M/V "Commando" Cruise 65-2--Shrimp (July 7-August 2); Bottomfish (August 6-24, 1965): To locate trawlable fishing grounds and to delineate commercial concentrations of shrimp were the primary objectives of this 4-week exploratory cruise in southeastern Alaska by the University of Washington research vessel Commando, which was chartered by the U. S. Bureau of Commercial Fisheries. Secondary objectives included the collection of data on the seasonal distribution and abundance of shrimp in waters off southeastern Alaska.

In the areas of explorations, echo-sounding transects were made to locate trawlable fishing grounds. Areas shown on the echo-recorder to be reasonably level and of soft consistency were fished with the 40-foot Gulf of Mexico-type shrimp trawl.

Fig. 1 - M/V Commando cruise 65-2 off southeast Alaska (July 7-August 2, 1965).

A total of 55 drags lasting about 30 minutes each were made during this cruise. Of those, 40 drags were made on the Continental Shelf between Coronation Island and Dixon Entrance in depths ranging from 38 to 153 fathoms. Shrimp catches of 0 to 180 pounds were taken in those offshore areas. Ocean pink shrimp (Pandalus jordani) dominated the shrimp catches, accounting for 83 percent of the total shrimp catch. Side-stripe (Pandalopsis dispar), spot (Pandalus platyceros), and other shrimp accounted for 13 percent, 1 percent, and 3 percent, respectively.

The remaining 15 drags were made in the Gulf of Esquibel (9 drags), Carroll Inlet (4 drags), and Affleck Canal (2 drags) in depths from 22 to 115 fathoms. Shrimp catches ranged from less than a pound to 100 pounds. In those inshore areas, pink shrimp (Pandalus borealis) accounted for 56 percent; side-stripe shrimp, 41 percent; and other shrimp, 3 percent of the total shrimp catch.

After a brief layover in June, the Commando began the summer phase of a general bottomfish survey off southeast Alaska. The cruise ended on August 24, 1965, after 2½ weeks of exploratory fishing operations.

Primary objectives of the bottomfish survey were to determine the ability of roller-rigged otter trawls to fish on rough bottom. Secondary objectives were to locate trawlable fishing grounds and to delineate commercial concentrations of bottomfish.

Fig. 2 - M/V Commando cruise 65-2 off southeast Alaska (August 6-24, 1965).

Sampling gear used was the 400-mesh eastern otter trawl. Accessory gear consisted of a 96-foot length of $\frac{3}{4}$-inch diameter wire rope, 18-inch and 14-inch hard rubber rollers, 9-inch rubber wing bobbins, 6-inch rubber spacers, and brass snap purse rings. The rollers, spacers, and purse rings were threaded on the wire rope and the two ends attached to the footrope ends by shackles. Snap purse rings were spaced along the roller gear at one-fathom intervals permitting the entire assembly to be attached or removed from the trawl footrope in a matter of minutes. Total length of the roller gear section was 42 feet--or slightly less than half the length of the trawl footrope.

Echo-sounding transects were made to locate trawlable fishing grounds and areas which appeared to be reasonably level were fished, regardless of the consistency of the bottom. Sounding effort was concentrated on the Continental Shelf between Noyes Island and Dixon Entrance. A total of 25 drags lasting about one hour each were attempted on bottoms ranging from soft to hard, as shown by the echo-recorder. Though hang-ups were encountered on nine occasions, the net was damaged in only two drags. On several occasions, the roller-rigged trawl was dragged over bottom considered marginal for ordinary trawls without damage to the net. However, further modifications to the trawl and roller gear will be necessary to reduce the high incidence of hang-ups. These include the lightening of the footrope of the trawl; the addition of rollers and spacers to cover the entire length of the footrope; and the use of a single dandy-line hook-up between door and trawl.

No large catches of commercially important bottomfish were made during the cruise. The largest catches were made in a drag two miles south of Cape Addington, where 200 pounds of petrale sole and 120 pounds of English sole were taken; and in another drag in Bucareli Bay, where 200 pounds of rock sole were caught.

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SHRIMP AND KING CRAB RESOURCES STUDIED:

M/V "John R. Manning" Cruise 65-3 (October-December 1965): Shrimp and king crab explorations in the inside waters of southeastern Alaska were to be conducted during a 10-week cruise starting October 4, 1965, by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John R. Manning. Principal objectives were to: (1) locate commercial concentrations of spot shrimp (Pandalus platyceros) and king crab (Paralithodes camtschatica), (2) test the relative fishing efficiency of 7 types of shrimp pots, and (3) collect data on the distribution and abundance of those species.

Plans called for explorations in depths ranging from 10 to 150 fathoms in the inside water surrounding Kuiu Island, the west coast of Kupreanof Island, northwest coast of Prince of Wales Island, and the lower east coast of Baranof Island. Shrimp pots were to be fished using a long-line system having 7 pots to each line; king crab pots were to be fished individually using separate buoys and buoy lines.

Alaska Fisheries Investigations

VERTICAL MOVEMENTS OF SHRIMP:

At the Kasitsna Bay biological research station of the U. S. Bureau of Commercial Fisheries, another 24-hour period was spent during September in following the vertical migration of pandalid shrimp. Two vertical strings of pots were fished in 50 fathoms of water. The pots were pulled, emptied, and reset every three hours. As in August, vertical ascent and descent of shrimp coincided with dusk and dawn. Unlike August, when pink shrimp dominated the catch, "humpies" made up most of the catch in September. Also present in larger numbers were male coonstripes which showed night distribtuion from surface to bottom. Female coonstripes did not leave bottom at any time.

* * * * *

LOW ABUNDANCE OF NORTHERN SOUTHEASTERN ALASKA YOUNG PINK SALMON:

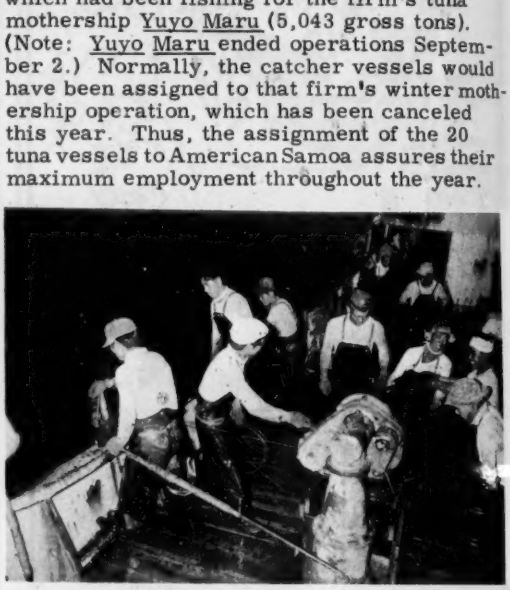
The 1965 cruise series in southeastern Alaska by the research vessel Heron ended on September 10. The absence of juvenile pink salmon in Peril and Chatham Straits was noted. This was considered to show the completion of the 1965 seaward migration of young pink salmon in northern southeastern Alaska. Young pink salmon were present until mid-September in 1963 and 1964.

In 1965 it was only the second year of these comprehensive surveys. However, observations in 1965 confirmed those made in 1964 that local juveniles emigrate through lower Chatham Strait. Following a severe winter, the 1965 salt-water temperatures were as much as 4° F. colder than during summer 1964 and growth of pink fingerlings was significantly less. Euphausids, which were the major late summer food supply in 1964, were not available in 1965 and large copepods became the primary food. Because the 1965 abundance of northern southeastern Alaska young pink salmon was considerably less along the salt-water migration routes than in 1964, and because the 1964 juveniles produced a low harvest, it might be expected that the harvest in 1966 will again be low and will be comparable to 1960 and 1962.

American Samoa

JAPANESE ASSIGN 20 TUNA LONG-LINE VESSELS:

A large Japanese fishing firm in September 1965 assigned to the tuna fishing base at American Samoa 20 100-ton class vessels which had been fishing for the firm's tuna mothership Yuyo Maru (5,043 gross tons). (Note: Yuyo Maru ended operations September 2.) Normally, the catcher vessels would have been assigned to that firm's winter mothership operation, which has been canceled this year. Thus, the assignment of the 20 tuna vessels to American Samoa assures their maximum employment throughout the year.



Japanese long-liner fishing for tuna in Pacific Ocean near American Samoa.

It is reported that the Japanese firm, in arriving at the decision to base the 20 vessels at American Samoa, took into consideration the fact that Japan needs to regain the initiative in negotiating ex-vessel prices with the United States firms operating canneries on that island. The dwindling strength of the Japanese tuna fleet and the increasing strength of the Formosan and South Korean vessels based on that island reportedly had created a situation wherein Japan was steadily losing the initiative in conducting price negotiations.

It is also reported that the Japanese firm is now seriously considering canceling all future mothership-type tuna operations. (Suisan Keizai Shimbun, September 21, 1965.)

Blue Crab

CLEANER-DEBACKER MACHINE TO BE TESTED UNDER COMMERCIAL CONDITIONS:

The U. S. Bureau of Commercial Fisheries recently accepted delivery of a machine to deback and clean blue crabs. After extensive testing by the Bureau's Technological Laboratory at College Park, Md., it will be loaned to industry for testing under commercial conditions. The machine was designed and built by the American Scientific Corporation, Alexandria, Va., under a contract with the Bureau.

Cleaner-debacker machine for blue crabs.

Blue crabs now are debacked and cleaned entirely by hand. Because of rising labor costs and the loss of skilled labor to other employment, the shellfish industry along the East and Gulf coasts has experienced diminishing returns in recent years. The machine is equipped to punch through the shell of precooked crabs, taking an amount of lump and flake meat equal to that picked by hand. The crab meat from the punched out portion can then be easily removed by hand. Tests have shown that the machine eliminates several steps of the hand operation.

Research is being continued to develop attachments to the machine which will further automate the blue crab cleaning process. Further research is aimed at devising machinery to remove any flake meat remaining in the crab as well as meat from the claws.

Note: See Commercial Fisheries Review, August 1965 p. 25.

California

LONG-RANGE PLAN FOR FISH AND WILDLIFE CONSERVATION AND DEVELOPMENT:

A Fish and Wildlife Plan for California, completed in fall 1965 by that State's Department of Fish and Game, is considered one of the most significant steps yet taken in the management of California's fish and wildlife resources. The Plan includes, for the first time, all the fish and wildlife resources of the State, and all the uses that are made of them. The Plan has been submitted for inclusion in the overall State Development Plan now under way.

Among others, some of the specific programs on major fish species as contained in the Plan include salmon and steelhead. The Plan points out that State control of salmon and steelhead spawning areas must be obtained in order to meet increased recreational demand and maintain the commercial fishery at least at its present level. Also, that greater attention will be given to land-use problems which cause sedimentation and turbidity.

The program for marine resources emphasizes that the problems of marine species are problems of managing human use, rather than managing or protecting habitat. Species use will be managed to produce maximum sustained yield, and methods will be sought to make greater use of underutilized species such as hake through experimental gear development and exploratory fishing. These and other approaches will be used toward the growth and economic development of the commercial fisheries in harmony with the recreational fisheries and other users. Included in the Plan is the establishment of a shellfish research laboratory to devise techniques needed for fuller development and utilization of California's shellfish resource. (California Department of Fish and Game, October 9, 1965.)

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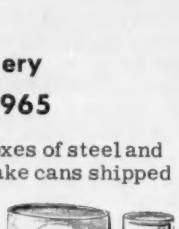
ANCHOVY FISHING UNDER REDUCTION PERMITS CONSIDERED BY STATE FISH AND GAME COMMISSION:

Proposed regulations governing anchovy fishing for reduction purposes were to be considered at a meeting of the California Fish and Game Commission, October 1, 1965, in Los Angeles, Calif. Eight fish processing firms have submitted applications for permits

to take anchovies off California for reduction into fish meal and other byproducts. The proposed regulations concerning permits for anchovy fishing are in the nature of a substitute for anchovy fisheries legislation vetoed by the Governor of California earlier in 1965. (News Release, California Department of Fish and Game, September 25, 1965.)

Cans--Shipments for Fishery Products, January-July 1965

A total of 1,765,898 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-July 1965 as compared with 1,586,934 base boxes used during the same period in 1964. In 1965, there was an increase in the U. S. canned pack of Maine sardines and Gulf shrimp.



Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.

Central Pacific Fisheries Investigations

OXYGEN STUDIES IN RELATION TO CATCHING TUNA:

Skipjack tuna in the eastern Pacific Ocean are caught in profitable commercial quantities with purse seines. In the central Pacific, where skipjack tuna also abound, purse seines are ineffective, and the fishing industry must continue to use the more expensive technique of pole-and-line fishing.

There are several theories as to why that should be true. One holds that sharply decreasing temperatures serve as a barrier, that is, that the thermocline, the thin layer of rapid temperature change between the warm surface layer and the underlying cold water, is not penetrated by the skipjack. During summer 1965 two high school boys, working under the direction of a professional scientist at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, gathered interesting data touching on another theory, that skipjack tuna avoid water of low oxygen content.

The two boys served as Hawaii Junior Science Apprentices in a summer science training program supported by funds from the National Science Foundation. Their supervisor was the head of the Laboratory's investigations in tuna behavior. The object of the study was to investigate the effects of water of low oxygen content on skipjack tuna.

One of the noteworthy differences between the eastern Pacific Ocean and the central Pacific is that in the east the mixed layer of the ocean is quite shallow--about 100 feet. The mixed layer is the uppermost layer of water. In it, temperature maintains a uniform value, and so do salinity and oxygen content.

In the eastern Pacific, oxygen values decrease sharply at the thermocline. From a surface measurement of 4.0 milliliters per liter or more (oxygen content is usually expressed in terms of volume), oxygen valued within and below the thermocline drop to 2.0 or less milliliters per liter.

In the central Pacific, the mixed layer is 200 to 400 feet thick. The oxygen content is as high as it is in the eastern Pacific, but declines only slowly with depth, reaching a value of 2.0 or less milliliters per liter at about 1,500 feet, or 15 times as deep as in the east.

A purse seine is essentially a flexible, floating fence about 200 feet deep. When tuna are surrounded in the central Pacific, they sound beneath the net and dart away. In the eastern Pacific they remain in the upper layers and can be caught. It has occurred to some scientists that in the eastern Pacific the low oxygen levels beneath the thermocline might serve as a floor to the tuna which like the majority of living creatures must have oxygen to survive. The creatures, they suggest, may avoid waters in which the oxygen content is so low that they risk death on entering them. Other kinds of fish have been found to actively avoid water with oxygen concentrations that are lethal to them. In the central Pacific, the creatures could find ample oxygen to 1,500 feet and thus would not be prevented escaping the nets by sounding.

To test the reactions of skipjack tuna to waters differing in oxygen concentrations, the Laboratory's tuna behavior expert and the boys made use of experimental tanks at

the Kewalo Basin facility of the Honolulu Biological Laboratory. Those tanks are supplied with water from a salt-water well. In the experiments, which the high school boys ran, the tanks were filled with oxygenated water. De-oxygenated water was then introduced and mixed to bring oxygen concentration down to a desired level. Next, a skipjack tuna was transferred to the tank. The boys noted the swimming speed of the skipjack and the amount of time it could survive in waters differing in oxygen concentrations.

In discussing the results obtained, the Laboratory's tuna behavior expert emphasizes that the experimental methods need to be much refined before the oxygen concentration lethal to tuna and avoided by them can be determined. Preliminary results suggest, however, that waters with as much as 3 milliliters per liter could be lethal.

In the 10 experiments that were run, it was found that all the fish died that were placed in waters with an oxygen level of 2.0 milliliters per liter. The time the fish survived varied from a few minutes to more than 2 hours, depending possibly on the hardiness of the individual fish or the way in which they were transferred to the experimental tanks. The fish increased their swimming speed, almost doubling the rate they maintained in water that was amply oxygenated.

In water in which the oxygen content was 3.0 milliliter per liter, the one fish tested died after a few minutes. Its swimming speed increased. When the water had an oxygen content of more than 3.4 milliliters per liter, the fish tested survived until removed from the tank at the end of the test period (about 8 hours).

Having completed their experiments and summarized them in technical papers, the boys returned to school. Meanwhile, plans are to follow up the interesting clues the boys' summer work provided.

Further problems are faced if it is proved that avoidance of oxygen-poor waters is an aspect of tuna behavior: How else can the fish be kept near the surface, so that they can be caught by seines? Or, if this proves completely infeasible, what methods can be devised to entrap these deep-swimming schools? The Honolulu Biological Laboratory is already conducting research aimed at answering those questions, for other research has pointed to the existence of large tuna resources in the central Pacific that are at present untouched, and those fish for the most part seem to be in the subsurface layers. The Laboratory's research vessel Townsend Cromwell is being equipped with new sonar equipment in order to study better the vertical and horizontal distribution of tuna of the central Pacific.

Note: See Commercial Fisheries Review, July 1965 p. 20.

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SUBMARINE FOR UNDERWATER RESEARCH BRINGS NEW DISCOVERIES:

A small and compact two-man research submarine was leased and used in September and October 1965 by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, for a 4-week period of research dives. The 16-foot Asherah carries a pilot and one scientist, has a speed of 2.5 knots, and can operate to a depth of 600 feet.

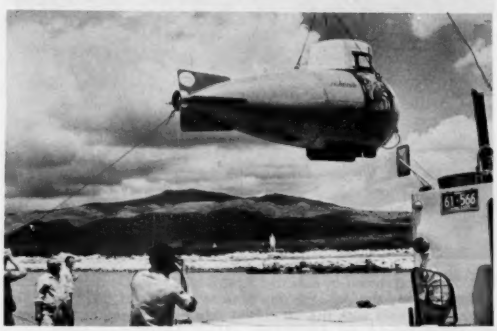

Fig. 1 - The two-man research submarine Asherah was used by the U.S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, for investigations of marine resources off the island of Oahu, Hawaii.

Working only about a mile from shore off the Island of Oahu, she has dramatically shown that submarines offer vast new research opportunities, according to the Bureau's Area Director in Hawaii. He also said that the Asherah has proved the limitations of scientific knowledge gained only by use of traditional surface craft.

Some of the submarine's findings bear directly on underdeveloped fishery resources of the central Pacific. Discoveries made during the Asherah's research dives included: (1) Schools of skipjack tuna, one of the great potential fishery resources of the Pacific, were observed at a depth of approximately 600 feet. It has never been known that they went to such depths. The commercial catch

depends on schools at the surface. (2) The small animals that constitute a part of the floating community (plankton) of the sea and on which fish feed were estimated to be 50 to 100 times as plentiful as data collected from surface vessels indicated them to be. (3) Large lobsters of a size not commonly caught in Hawaii were found in crevices several hundred feet beneath the sea surface. (4) Precious coral never harvested in the islands was believed to have been found growing at great depths.

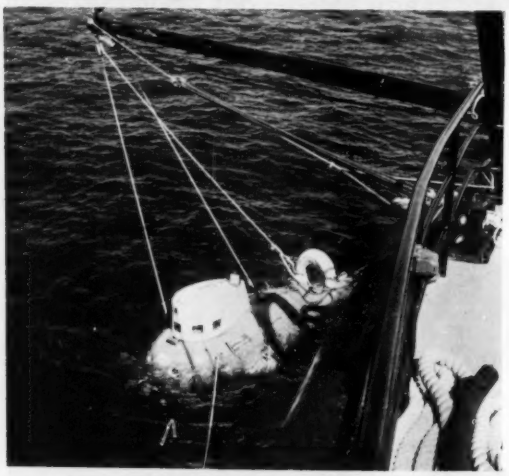

Fig. 2 - Constructed by Electric Boat Division of General Dynamics Corporation, the Asherah can dive to a depth of 600 feet. She communicates with the attending ship by underwater telephone.

The Asherah was delivered to the Honolulu Biological Laboratory on September 16 and began diving on September 18. By the end of that month she had completed 28 dives. These were divided into seven categories: deep-light station, night-light patrol, plankton and forage survey, gear evaluation, bottom resource survey, current measurement, and acoustic survey. In addition, shakedown and demonstration dives were conducted.

Among the other more interesting findings of those dives were: The diving area consisted of a shelving sandy bottom, which deepens from 90 to 380 feet by a series of shallow ledges. Each ledge is a congregating point for fish, and often also represents a cleaning station for the wrasse Labroides. Many of the sandy slopes contain dense beds of Pinna oysters. Sometimes as much as two-thirds of the bottom is devoted to Pinna, with about 50 shells to the square foot. Beyond the 350-foot level, the bottom drops away precipitously at an angle of 60° to 80°. Small ledges and boulders provide scant shelter for deeper water fish. Myriads of small fish occur as dense bands along this cliff face from 400 to 600 feet deep, and schools of small tuna, amberjack jack, and snappers prey upon them. Skipjack tuna were observed feeding at about 600 feet. Many animals commonly regarded as inshore forms range down to the deepest diving depth, 630 feet. Plankton were found to be very dense from 200 to 600 feet, with some indications of layering at night. Peculiar behavior (inverted swimming) was noted for opelu (Decapterus pinnulatus) between 290 and 360 feet. Current measurements were made by allowing the submarine to drift at selected depths, and the craft was also used for evaluating expendable bathythermographs. Acoustic surveys were undertaken, and various biological sounds, such as fish noises, were recorded. Dives were made both in the daytime and at night.

Fig. 3 - At night, the Asherah is tied to the raft Nenue, seen here. Operations are being conducted close to shore on the leeward side of Oahu.

Limited though the capacities of the Asherah were, the craft has shown the scientific benefits that will reward the more extensive use of submarines in research.

Federal Purchases of Fishery Products

DEFENSE DEPARTMENT AMENDS INSPECTION REQUIREMENTS FOR FROZEN RAW BREADED FISH PORTIONS:

New inspection requirements, effective November 1, 1965, for frozen raw breaded fish portions purchased by the U. S. Department of Defense were announced in Headquarters Notice to the Trade No. 110(65) of September 10, 1965, issued by the Defense

Personnel Support Center, Philadelphia, Pa. (That agency absorbed the Defense Subsistence Support Center on July 10, 1965.)

The new inspection requirements are contained in DPSC Articles 341 of October 1, 1965 (which replace DSSC Articles 341 of June 1, 1965), and will be effective with awards made on and after November 1, 1965.

Among other changes indicated in the revised Articles is one that permits an increased weight tolerance for the fish portions.

Copies of the revised inspection requirements for fish portions may be obtained from regional offices of the Defense Personnel Support Center.

Note: See Commercial Fisheries Review, Sept. 1965 p. 22, June 1965 p. 19.

Fisheries Laboratory

NEW GAME FISH RESEARCH LABORATORY FOR FLORIDA GULF COAST:

Panama City in Florida was selected by the U. S. Department of the Interior as the site for a new Federal marine game fish research laboratory to be operated by the Bureau of Sport Fisheries and Wildlife, announced Interior's Secretary Stewart L. Udall, October 8, 1965. Estimated cost of the new facility is about $2 million.

The new laboratory is expected to make a major contribution to sport fishing in the eastern Gulf of Mexico through studies of migratory species of marine game fishes, Secretary Udall said. It will be the latest in a system of coastal research centers authorized by Congress in 1959 to undertake a national research program on salt-water game fish. The goal of this program by the Bureau of Sport Fisheries and Wildlife is to get the answers needed to provide wise conservation and sound management for marine game fish resources.

Marine game fish research laboratories already have been established at Sandy Hook, N. J.; Tiburon, Calif.; and Narragansett, R. I. The fourth and fifth laboratories--the one in Panama City for the eastern Gulf of Mexico and the other in Texas to cover the western Gulf areas--were in the planning and design stages at the time of the announcement. The exact location of the Texas laboratory has not been determined.

When completed, the five laboratories will provide for a coordinated, nationwide research program aimed at answering many of the problems affecting the Nation's salt-water sport fishing resources, Secretary Udall said.

Fur Seals

PRIBILOF ISLANDS FUR SEAL SKIN HARVEST, 1965:

During the 1965 sealing season, the harvest of fur seal skins by the Pribilof Islands staff of the U. S. Bureau of Commercial Fisheries amounted to 51,020 skins. Of that total, 41,216 skins were from males, 6,352 immature females, and 3,452 mature females. In addition, about 1,500 skins were taken for experimental purposes.

Fig. 1 - A large reserve "pod" of fur seals awaiting selection and harvesting.

The fur seal skin harvest in 1965 was below the 1964 harvest by 13,186 skins. In 1964 a total of 64,206 skins was harvested.

Fig. 2 - Driving a group or "pod" of Pribilof fur seals to the killing field on St. Paul Island.

The fur seal herds on the Pribilof Islands are managed and harvested by the Interior Department's Bureau of Commercial Fisheries which cures the seal skins before shipping them to a processor. Seven-eighths of the harvest goes to the Fouke Fur Company, Greenville, S. C., for processing and sale for the account of the United States. One-eighth

of the harvest is set aside for experimental processing by interested firms.
Note: See Commercial Fisheries Review, November 1964 p. 30.

Great Lakes

MICHIGAN PROPOSES CHANGE IN YELLOW PERCH COMMERCIAL FISHING REGULATIONS:

A change to liberalize commercial yellow perch fishing in Saginaw and Tawas Bays to prevent a potentially heavy fish waste is being considered by fisheries officials of Michigan's Conservation Department. The Department would like to loosen regulations so that commercial operators in those waters could be allowed to keep and sell all yellow perch they catch in gill nets of $2\frac{1}{2}$-inch mesh size.

The yellow perch size limit for those nets now is $8\frac{1}{2}$ inches. Experience is showing that the regulation is too restrictive, since about 50 percent of the perch taken are too small. The small perch--most of which measure just under the minimum size limit--must be brought to port by commercial operators. But because they cannot be sold commercially, large numbers of them never reach the market. The Conservation Department is authorized to dispose of undersized perch to charitable institutions, but the supply appears likely to exceed demand if current trends continue, and this points to the possibility of a large waste.

The problem of too many sublegal size fish is tied to the fact that the yellow perch population of the two Bays is stagnated. According to the Conservation Department, those fish grow rather rapidly to about 8 inches but it takes them six years to reach legal size. The Department's fisheries officials say the best way to correct the problems for sport fishermen as well as commercial fishermen is by removing the present size restriction for taking yellow perch with commercial gear. The liberal change, they explain, would encourage more commercial fishermen to profitably harvest perch and, with fishing pressure increased, there would be a more rapid turnover in the perch populations of Saginaw and Tawas Bays. This, in turn, would provide conditions for healthier, faster-growing perch to be harvested by both commercial and sport fishermen.

Another point in the Department's plans is that a revitalized population of yellow perch would be in better condition to resist competition from alewives, members of the herring family which are crowding Great Lakes waters and fast becoming a major nuisance.

A formal recommendation on the matter was scheduled to come before the State of Michigan's Conservation Commission meeting held in Lansing. (Michigan Department of Conservation News Bulletin, Lansing, October 1, 1965.)

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MICHIGAN PLANS TO INTRODUCE STRIPED BASS IN SOUTHERN WATERS:

Plans of the State of Michigan's Conservation Department to introduce striped bass in the southern Great Lakes were approved in September 1965 by that State's Conservation Commission. The Conservation Department planned to submit its proposed striped bass program to other fishery agencies and the Great Lakes Fishery Commission in late 1965 in hopes of also getting their approval.

According to the Conservation Department's fishery chief, striped bass plantings are scheduled to be started in spring 1966 as a two-in-one approach aimed at providing a new brand of sport fishery and at the same time control alewife populations which are overrunning the Great Lakes. The "striper," a spectacular long-lived fish which grows to 15-20 pounds in 4 or 5 years, is considered the best single hope for weeding out excessive alewife numbers which now account for an estimated 95 percent of the Great Lakes' total fish volume.

It was pointed out to the Commission that the successful introduction of the "striper" is no sure-fire thing, but all signs indicate that the State of Michigan has everything to gain by trying to establish that salt-water species which has made the grade in some fresh waters. Waters of the upper Great Lakes are considered too cold for striped bass, but the Department is attempting to cover all aspects by also introducing coho (silver) salmon during spring 1966 in northern areas. The coho salmon, like the striped bass, feeds heavily on alewives.

In relation to the Department's plans for the striped bass program, the fishery chief stated that Michigan must take a leadership

role in providing recreational fishing in the Great Lakes. With control of the sea lamprey now in prospect, he stressed that the time now is ripe to reorient management goals toward sport fishing interests in the Great Lakes. He noted that state and Federal agencies are very much involved in efforts to reestablish the lake trout in the Great Lakes. But he said the lake trout's recovery may never reach its full potential unless the alewife situation is also controlled because eggs and the young of lake trout may be subject to predation by the alewives. Both the striped bass and coho salmon spawn in streams where their young should be safer from alewife attacks, added the Department's fishery chief. (Michigan Department of Conservation, Lansing, September 23, 1965.)

Note: See Commercial Fisheries Review, April 1965 p. 21.

Gulf Fisheries Explorations and Gear Development

SHRIMP GEAR STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 61 (July 21-October 1, 1965): Studies to determine the electrical parameters necessary to deburrow shrimp from various bottom types were continued during this cruise in the northern Gulf of Mexico by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers. The major objective was to obtain motion picture records of the escape behavior of individual shrimp burrowed in a soft sand substrate when stimulated with different electrical voltages and pulse rates. Another objective was to determine whether or not shrimp escape behavior is affected by the type and compaction of bottom sediments.

Using motion picture cameras, SCUBA divers recorded rates of deburrowing and escape behavior of electrically-stimulated shrimp burrowed in four types of substrata. This consisted of filming more than 600 individually stimulated shrimp on 3,100 feet of 16-millimeter colored movie film. The escape reactions were recorded from white sand, light gray sand, dark gray sand, and soft black mud bottoms. Samples of the bottom sediments were taken at each station and were to be processed to determine sediment size and percent water content. In addition, bottom temperature, salinity, current velocity, and direction, as well as the attenuation coefficient of light, were obtained for each locality. Diver observations tend to indicate little difference between the escape behavior of shrimp stimulated from the different sand substrata tested up to that time. However, it appears that shrimp escape more readily from black mud substrata than from sand sediments. Further, observations indicate that it is possible to alter shrimp escape reaction by changing the voltage intensity.

Preliminary information on the escape reactions of electrically-stimulated shrimp burrowed in soft and hard sand type bottoms has been obtained from earlier cruises. Data collected on this cruise, when combined with information collected from those earlier cruises, will provide a comprehensive record of the optimum electrical requirements necessary to force shrimp to deburrow from a white sand substrata. Objectives for future cruises of this type will be to determine similar requirements for clay and other type mud and sand bottoms.

Note: See Commercial Fisheries Review, September 1965 p. 28.

Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-33 (September 8-19, 1965): Brown shrimp were predominant in the catches made during this cruise by the chartered research vessel Gus III of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. Catches of 21-30 count brown shrimp were good at 25-fathom stations off western Louisiana, although the best catches of 21-30 count brown shrimp were taken off Texas at 11-20 fathoms. White shrimp catches were light, but showed some improvement over those taken during sampling in August 1965. Pink shrimp catches were negligible.

As part of a continuous Gulf of Mexico shrimp distribution study, 7 statistical areas were covered and 24 standard 3-hour tows with a 45-foot flat trawl were made. Other work in the survey area included 41 plankton tows, 34 bathythermograph (BT) and 182 water (Nansen bottle) casts, and 55 bottom grabs.

The largest catch of the cruise was taken in area 18 which yielded 80 pounds of 26-30 count brown shrimp from 11-20 fathoms and

58 pounds of 26-30 count brown shrimp from depths over 21 fathoms. Area 20 produced 72 pounds of 26-30 count brown shrimp from 11-20 fathoms and 46 pounds of 26-30 count brown shrimp from depths over 21 fathoms. Other good catches of brown shrimp (all taken in over 21 fathoms) included 68 pounds of 21-25 count from area 17; 24 pounds of 21-25 count from area 16; and 22 pounds of 41-50 count from area 13.

The best white shrimp catches were taken in areas 13 and 16, both of which yielded 11 pounds of small (over 51 count) white shrimp from depths under 10 fathoms.

After sampling was completed in the eastern survey area, the research vessel Gus III traveled to Key West, Fla., to carry out shrimp-staining experiments for about 1 month. While crossing, an extensive oceanographic survey was made to determine the effects of Hurricane Betsy on the underlying water mass in the northeastern Gulf of Mexico; 41 hydrographic stations were occupied, and 166 bathythermograph casts were made. In addition, 70 Secchi disc readings were obtained.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, Nov. 1965 p. 22.

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Some of the highlights of studies conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., during July-September 1965:

SHRIMP BIOLOGY PROGRAM: Shrimp Larvae Studies: During the quarter, 190 plankton samples collected from January through May 1964 were examined for planktonic-stage penaeid shrimp. Analysis of catch data for this period revealed that planktonic-stage penaeids were distributed throughout most of the survey area and that the overall catch was slightly higher over the western portion of the shelf (Galveston to Port Mansfield) than in the eastern portion (Galveston to the Mississippi River). In addition, the relative abundance of planktonic-stage penaeids showed a distinct decrease from the abundance in the fall of 1963.

Enumeration of the catch of planktonic-stage Penaeus spp. by developmental stage showed that 61 percent were postlarvae, 13 percent myses, 11 percent protozoeae, and 15 percent nauplii. Postlarvae occurred each month, with peak abundance in March, followed by a decrease in numbers through May. They were about three times more abundant in the waters to the east of Galveston than to the west. A gradual shift in postlarval abundance from waters seaward of 25 fathoms to waters shoreward of 15 fathoms was evident after March. Mysis stages were taken throughout the period but with no apparent depth pattern. Naupliar and protozoeal stages (spawning indicators) did not occur in the catch until April followed by a slight increase in numbers during May. These stages were most abundant in the 15- to 25-fathom depth range.

Larvae of the seabob, Xiphopeneus krøyeri, were reared to postlarvae in mass culture, and sufficient numbers of larvae were preserved for future taxonomic studies. In a feeding experiment, seabob larvae given Gymnodinium splendens, Thalassiosira sp., and Exuviella sp. had better survival than those fed Skeletonema sp. Also, additions of mixed algal cultures gave better survival than additions of their iidividual components.

Data on the seasonal distribution and abundance of 32 species of fish caught in trawling operations during monthly U. S. Bureau of Commercial Fisheries research cruises off Louisiana and Texas during the period 1962-64 were analyzed during the quarter. All data acquired from biological sampling stations in the waters off Louisiana have been analyzed. Atlantic croaker, Micropogon undulatus, and sea catfish, Galeichthys felis, usually constituted the greatest catch (by weight) on the commercial white shrimp fishing grounds (under 10 fathoms) off Louisiana from 1962 to 1964. Greatest seasonal variation in catches occurred off western Louisiana and the least off central Louisiana.

Cultivation of Shrimp in Artificial Ponds: Mass mortality of the brown shrimp, which were stocked as postlarvae, occurred in the circulating-water pond on July 3-4, 95 days from the date of stocking. This kill appeared to be due to a combination of several factors, namely, a phytoplankton bloom, inadequate water circulation, and high water temperature. Approximately 2,000 shrimp (average total length 97.4 mm.), weighing 22.8 pounds, were recovered from the pond. Projection of these figures reveals that the culturing method (circulating water and daily feeding) employed resulted in the production of 210 pounds of shrimp per acre in a 95-day growing period.

In our second pond, in which water is not circulated and food is provided by inducing plankton blooms through the application of fertilizer, excellent shrimp growth was observed for a short period of time. During a 55-day growing period, shrimp made gains equivalent to approximately 118 pounds per acre. They failed, however, to make further gains.

In an attempt to determine whether food was the limiting factor, one-half of the shrimp (1,058 individuals) were transferred from the static pond to the circulating-water pond and fed at the rate of 2 pounds per day. Over a 5-week period, those shrimp revealed a 20-mm. length and 4.5-g. weight increase over those remaining in the static-water pond. Further experiments in which food levels were varied between alternate weeks, showed corresponding growth fluctuations proportional to the level of food supplied.

Postlarval white shrimp were stocked inadvertently with brown shrimp postlarvae in the static-water pond. The growth of white and brown shrimp, expressed as average weight and length at the end of a 120-day period, is compared in this table:

Species	Average length (mm.)	Average weight (g.)
Brown shrimp	79.6	3.5
White shrimp	126.5	14.6

These results suggest that it may be more feasible to rear white shrimp than brown shrimp under semi-natural conditions.

Movements, Growth, and Mortality of Commercial Shrimps: The recovery phase of the pink shrimp mark-recapture experiment which started early last spring on the Florida Tortugas grounds is now complete. Of the 11,555 stained shrimp released, 6,059 (52.4 percent) have been recovered. This unusually high proportion of recoveries apparently resulted from the fact that the marked shrimp were released in the center of the fishery during its most active period.

Several groups of stained white shrimp were released in Galveston Bay during July to obtain information concerning their growth and movements. By mid-September, recaptured shrimp amounted to only 7 percent of the 9,448 released.

Commercial Catch Sampling: Commercial catch sampling methods at Aransas Pass, Freeport, and Galveston, Tex., were altered during the quarter. A randomized sampling schedule is now being followed in order to reduce biases created by oversampling the landings at some shrimp houses. This sampling scheme is designed to give all vessels an equal chance of being sampled and to provide a means for establishing confidence limits for estimates of catch per unit of effort and the size composition of landings. Agents stationed at the three ports obtained interviews from 49 percent of the 3,613 vessels landing during July and August. Length measurements from a sample of shrimp were collected from 9 percent of the landings.

A cruise was made during the quarter to compare catches made by the Bureau's chartered research vessel Gus III with those of commercial shrimp boats. Thirteen 2-hour trawls and three 1-hour trawls were made in an area off Freeport which was being heavily fished by the commercial fleet. Two 45-ft. flat nets were towed in a manner similar to that used by commercial vessels. The 16 trawl samples made by the Gus III averaged 41.4 pounds of headless shrimp per hour. Information from port samplers shows an average of 40.0 pounds per hour taken by 11 vessels seen fishing in the same vicinity. Forty vessels, whose interviews indicate that they too were fishing near the Gus III, had an average catch of 38.1 pounds of headless shrimp per hour. These findings suggest that interviews provide accurate catch/effort information for specific areas, and that the Gus III can be used satisfactorily as a sampling device to estimate the relative abundance of shrimp in a given area.

Surveys of Postlarval Abundance and Fisheries for Bait (Juvenile) Shrimp: Higher than usual numbers of postlarval brown and white shrimp were caught in tows at Galveston Entrance and Sabine Pass during the quarter. In fact, average numbers of postlarval brown shrimp taken at Galveston Entrance during September were higher than the catches for any month of the spring peak of postlarval shrimp movement.

Bait shrimp production in the Galveston Bay system during July and August rose by less than 1 percent from that recorded for the same period in 1964. Effort expenditure for those months, however, increased by 5 percent indicating that fewer shrimp were available to commercial bait-shrimp fishermen during the quarter. Bait-shrimp landings for July and August contained higher percentages of juvenile brown shrimp than during the same period in 1964, indicating a smaller crop of white shrimp this year.

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Regular hydrological and biological sampling in the Galveston Estuary continued during the quarter at the established sampling locations. The sampling frequency was reduced from weekly to semimonthly after most of the brown shrimp returned to the Gulf. Semimonthly sampling were to continue until late fall, or until the white shrimp leave the estuary.

The bay anchovy was the most numerous of the major species caught during the quarter, followed in descending order by the brown shrimp, white shrimp, croaker, sand sea trout, sea catfish, spot, and blue crab. The relative abundance of those species was considerably different than during the same quarters of 1963 and 1964 when white shrimp ranked first and brown shrimp fifth and fourth, respectively.

Postlarval brown shrimp entered the Galveston Estuary throughout the late winter and spring of 1965 in relatively large numbers. In contrast, during 1964 the invasion was in March and lasted for only a short time. During the period of postlarval recruitment (January-May), more portlarvae were caught per tow during 1965 than in 1964.

We can only speculate at this time that there may be a correspondingly larger harvest in the Gulf of Mexico. A preliminary look at the offshore harvest statistics so far indicates that large volumes of brown shrimp are being caught.

EXPERIMENTAL BIOLOGY PROGRAM: Behavior and Ecological Parasitology: Observation of living shrimp under laboratory-controlled conditions has provided new information on burrowing behavior in the two most important commercial species of the northwest Gulf of Mexico. Results indicated that juvenile brown shrimp will burrow in response to gradually reduced temperature. The data suggested a relationship between size of animal and temperature at which burrowing occurs--the larger shrimp (78-80 mm.) responding before the others (50-63 mm.) as temperature declined from 25° to 15° C. (77° to 59° F.).

The suggestion that burrowing is a size-related shrimp response to cold prompted us to extend the size range of test animals to include the smallest shrimp readily available to us. Thus, similar experiments were conducted using postlarval brown shrimp (8½-13 mm.). Those also burrowed when water temperatures were lowered to 16½°-12° C. (61.7°-53.6° F.), if the substrate was sufficently soft and the rate of temperature change was not too rapid. (Change rates of 1° C. per 5, or more, minutes were satisfactory for the induction of burrowing.) It is particularly interesting to note that postlarval white shrimp collected with the brown postlarvae were unable to burrow under our experimental conditions. Thus, the burrowing habit in postlarval brown shrimp may have special significance as a protective behavioral mechanism which has adapted these organisms, better than white shrimp postlarvae, for survival at reduced temperatures.

Such an interpretation is certainly in keeping with what is presently known of the seasonal differences in postlarval distribution of the two species. The fact that soft substrate texture is required for successful burrowing suggests that physical characteristics of natural

substrates may be an important determinant of brown postlarval survival at late winter or early spring water temperatures.

Growth and Survival Studies: Two studies using laboratory-reared postlarvae were conducted--one with pink shrimp and the second with brown. Two temperatures were checked, 25° C. (77° F.) and 33° C. (91.4° F.), with 120 individuals of each species. The salinity in each experiment was about 20‰, which is salinity to which the shrimp were accustomed.

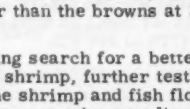
Temperature had a great effect on the growth of both species. Pink shrimp increased, in weight, 120-fold at 25° C. and 770-fold at 33° C. The brown increased, in weight, 460-fold at 25° C. and 1,535-fold at 33° C. The difference in weight increase between the species can be explained partially by the disparity in the initial weights of the animals. The pink initially weighed 0.70 mg. and the brown 0.25 mg.

The survival of the pink shrimp at the temperatures tested was 85 percent at 25° C. and 77 percent at 33° C. The brown shrimp did not survive as well--58 percent at 25° C. and 32 percent at 33° C. This may have been related to the small initial size of the animals.

A study was conducted on the effects of temperature on growth of white shrimp. Nine temperatures were tested in 2.5° increments from 15° C. (59° F.) to 35° C. (95° F.). Growth rate increased generally with temperature from 15° to 32.5° C., with some fluctuation at 27.5°, 30.0°, and 32.5° C. At 35° C., growth rate was between that at 22.5° and 25.0° C. Survival at the two extremes tested (15° and 35° C.) was similar--31 percent and 37 percent, respectively. Survival at all other temperatures was 70 percent or better. The differential effects of temperature on the two species become evident when the results of this experiment are compared with those of a similar study using brown shrimp. At the lowest temperature (15° C.), brown shrimp fared much better than the white. Survival rates of the two species were comparable at temperatures from 17.5° to 27.5° C. The white shrimp survived much better than the browns at 30°, 32.5°, and 35° C.

In the continuing search for a better diet for juvenile and subadult shrimp, further tests were conducted using frozen brine shrimp and fish flour. Neither of those diets gave encouraging results. Animals fed frozen brine shrimp had a mean increase of 1.14 mg. in 27 days, and animals fed fish flour showed a mean increase of 0.71 mg. for the same period. Further studies will be conducted to learn of a suitable diet.

Note: See Commercial Fisheries Review, June 1965 p. 22.



Industrial Fishery Products

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production, August 1965: During August 1965, a total of 40,946 tons of fish meal and 37.7 million pounds of marine-animal oil was produced in the United States. Compared with August 1964 this was an increase of 7,413 tons of fish meal and about 9.4 million pounds of marine-animal oil. Fish solubles production amounted to 18,351 tons--an increase of 3,683 tons as compared with August 1964.

U. S. Production of Fish Meal, Oil, and Solubles, August 1965 1/ with Comparisons

Product	August		Jan.-Aug.	
	1/1965	1964	1/1965	1964
	(Short Tons)			
Fish Meal and Scrap:				
Herring	2,944	2,138	9,654	7,098
Menhaden 2/	33,307	25,973	136,031	125,421
Tuna and mackerel	2,911	1,854	17,163	13,030
Unclassified	1,784	3,568	14,233	29,811
Total	3/40,946	3/33,533	3/177,081	3/175,360
Fish solubles:				
Menhaden	15,876	11,944	57,132	54,306
Other	2,475	2,724	13,915	17,401
Total	18,351	14,668	71,047	71,707
	(1,000 Pounds)			
Oil, body:				
Herring	1,870	3,256	6,125	9,193
Menhaden 2/	34,286	23,513	139,759	122,838
Tuna and mackerel	629	852	2,936	2,839
Other (inc. whale)	951	743	3,764	5,896
Total oil	37,736	28,364	152,584	140,766

1/Preliminary data.
2/Includes a small quantity of thread herring.
3/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

* * * * *

Major Indicators for U. S. Supply, August 1965: United States production of fish meal

Major Indicators for U. S. Supply of Fish Meal, Solubles, and Oil, August 1965

Item and Period	1/1965	1964	1963	1962	1961
	(Short Tons)				
Fish Meal:					
Production:					
August	40,946	33,533	43,609	40,440	57,537
Jan.-Aug. 2/	177,081	175,360	172,613	217,878	223,474
Imports:					
August	13,856	36,543	43,987	28,253	19,026
Jan.-Aug.	242,407	321,835	269,144	194,996	145,562
Fish Solubles 3/:					
Production:					
August	18,351	14,668	19,532	16,811	19,685
Jan.-Aug. 2/	71,047	71,707	80,066	90,525	82,474
Imports:					
August	168	125	-	422	318
Jan.-Aug.	3,521	3,682	2,769	5,018	2,245
	(1,000 Lbs.)				
Fish Oils:					
Production:					
August	37,736	28,364	34,610	33,401	49,671
Jan.-Aug. 2/	152,584	140,766	133,189	176,718	195,935
Exports:					
August	21,206	9,664	37,455	33,272	13,304
Jan.-Aug.	67,521	106,252	164,604	96,405	85,853

1/Preliminary.
2/Data for 1965 based on reports which accounted for the following percentage of production in 1964: Fish meal, 89 percent; solubles, 89 percent; and fish oils, 99 percent.
3/No homogenized fish was produced in 1964 or during the first 8 months of 1965.

and fish oil in August 1965 was higher by 22.1 and 33.0 percent, respectively, as compared with August 1964. Production of fish solubles was higher by 25.1 percent.

* * * * *

Production by Areas, September 1965: Preliminary data as collected by the U. S. Bureau of Commercial Fisheries:

U.S. Production 1/ of Fish Meal, Oil, and Solubles, September 1965 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles
	Short Tons	1,000 Pounds	Short Tons
September 1965:			
East & Gulf Coasts	15,989	15,046	7,214
West Coast 2/	2,320	540	1,428
Total	18,309	15,586	8,642
Jan.-Sept. 1965 Total	192,140	163,784	78,680
Jan.-Sept. 1964 Total	198,178	160,546	81,655

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.

* * * * *

U. S. FISH MEAL AND SOLUBLES: Production and Imports, January-August 1965: Based on domestic production and imports, the United States available supply of fish meal for the first 8 months in 1965 amounted to 419,488 short tons--77,707 tons (or 15.6 percent) less than during the same period in 1964. Domestic production was 1,721 tons (or 1.0 percent) more but imports were 79,428 tons (or 24.7 percent) lower than in January-August 1964. Peru continued to lead other countries with shipments of 201,358 tons.

U. S. Supply of Fish Meal and Solubles, January-August 1965

Item	Jan.-Aug. 1/1965	Jan.-Aug. 1964	Total 1964
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	136,031	125,421	160,349
Tuna and mackerel	17,163	13,030	21,113
Herring	9,654	7,098	8,881
Other	14,233	29,811	44,909
Total production	177,081	175,360	235,252
Imports:			
Canada	28,987	38,678	54,769
Peru	201,358	257,604	348,025
Chile	5,128	11,082	12,942
Norway	49	-	-
So. Africa Rep.	2,900	11,938	18,581
Other countries	3,985	2,533	4,826
Total imports	242,407	321,835	439,143
Available fish meal supply	419,488	497,195	674,395
Fish Solubles:			
Domestic production 2/	71,047	71,707	93,296
Imports:			
Canada	1,095	1,162	1,553
So. Africa Rep.	-	860	987
Other countries	2,426	1,660	1,965
Total imports	3,521	3,682	4,505
Available fish solubles supply	74,568	75,389	97,801

1/Preliminary.
2/50-percent solids.

The United States supply of fish solubles during January-August 1965 amounted to 74,568 tons--a decrease of 1.1 percent as compared with the same period in 1964. Domestic production dropped 0.9 percent and imports of fish solubles decreased 4.4 percent.

Inland Fisheries Explorations and Gear Development

OAHE RESERVOIR TRAWLING STUDIES: Reservoir Research Vessel "Hiodon" Cruise 2 (August 1965): To delineate areas for effective bottom trawling and collect catch and biological data was the primary purpose of this exploratory cruise in Oahe Reservoir located in South and North Dakota. This intermittent 20-day trawling operation by the reservior fishery research vessel Hiodon of the U. S. Bureau of Commercial Fisheries was completed on August 17, 1965.

Bottom tows were made in zones 3, 4, and 6 between reservior miles 70 to 124. Only 22 tows lasting 15 minutes each were completed during the cruise. Large quantities of organic debris were taken in some tows which greatly reduced fish catches. Six tows were incomplete due to large trees taken in the trawl. All but one trawl was torn badly during the cruise.

FISHING OPERATIONS: Twelve 15-minute tows were made with a 55-foot (headrope length) bottom trawl and 9 tows were made with a 35-foot bottom trawl. Mesh size (extended measure) of the cod end of both trawls was $1\frac{1}{4}$ inches but the 35-foot trawl contained a $\frac{1}{2}$-inch mesh liner in the cod end. All but one tow was made over inundated bottomlands or pastures, with depths trawled ranging from 12 to 85 feet.

FISHING RESULTS: With the 35-foot trawl, 9 tows were made at depths less than 61 feet which yielded 5,883 fish (age group II or older) weighing 1,252.6 pounds. Average catch

per 15-minute tow was 654 fish and 139 pounds. The total weight of the catch consisted of 38.9 percent yellow perch (6-7 inches long--mostly the 1963 year-class), 30.7 percent carp (1 to 2 pounds--mostly the 1962 year-class), 6.8 percent carpsuckers, 5.7 percent black bullheads, 4.7 percent drum, and 4.0 percent goldeye. One tow fished at 80 feet caught 5 fish that weighed 2.3 pounds. The rate of catch tended to decrease with an increase in depth. The largest single catch of yellow perch was 398.2 pounds and of carp 132.9 pounds.

Young-of-the-year and yearling fish were counted and weighed in the catches of 8 tows with the 35-foot trawl. The 8,050 young-of-the-year fish caught consisted of 7,261 yellow perch, 780 crappie, 7 northern pike, and 1 each of goldeye and burbot. The 83 yearling fish consisted of 29 yellow perch, 21 carpsuckers, 12 black bullheads, 8 each of crappie and sauger, 3 common suckers, 2 goldeye, and 1 carp.

A total of 12 tows with the 55-foot trawl yielded 1,598 fish that weighed 861 pounds. The average catch per tow was 133 fish and 71.8 pounds. The average catch in pounds for different depths was: 181.0--12 to 30 feet; 14.0--35 to 60 feet; and 26.5--80 to 85 feet. The total weight of the catch consisted of 66 percent carp (53 pounds per tow, primarily fish of the 1962-year class), 9.4 percent perch, 6.9 percent goldeye, 5.8 percent bigmouth buffalo, 3.0 percent burbot, and 6.4 percent other species. The largest single catch was 471.5 pounds of carp.

Catches of single tows ranged from 2.5 to 586.5 pounds. Since the primary object of the cruise was to delineate areas for successful trawling, no attempts were made to duplicate good catches in the same area or at the same time. Plans were to confine tows in a later cruise to the best trawling grounds to determine the probability of sustained high catches under intensive trawling in a given area.

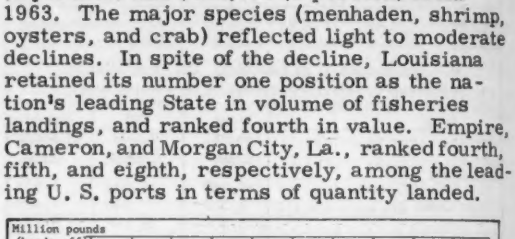
Buffalofish (the most abundant species in Oahe Reservoir) were not often taken in the trawl probably because that species tends to remain in the upper stratum of deeper waters in the summer months. Since this may apply to other species as well, catch rates and character of the catches presumably may change considerably in the fall of the year.

Note: See Commercial Fisheries Review, November 1965 p. 24.

Louisiana

LANDINGS AND FISHERY TRENDS, 1964:

Summary: Commercial landings of fish and shellfish in Louisiana during 1964 totaled 703.6 million pounds with an ex-vessel value of $34.7 million--down 57.1 million pounds (8 percent) and $511,000 (1 percent) from 1963. The major species (menhaden, shrimp, oysters, and crab) reflected light to moderate declines. In spite of the decline, Louisiana retained its number one position as the nation's leading State in volume of fisheries landings, and ranked fourth in value. Empire, Cameron, and Morgan City, La., ranked fourth, fifth, and eighth, respectively, among the leading U. S. ports in terms of quantity landed.



Louisiana shrimp landings by months, 5-year period 1960-64.

The 1964 Louisiana catch was taken by 10,408 fishermen operating 1,602 documented vessels (5 net tons and over) and 4,417 other boats. Louisiana manufacturing establishments in 1964 produced fishery products valued at over $55 million at the wholesale level.

Shrimp: Louisiana shrimp landings in 1964 of 59.4 million pounds heads-on (38.1 million pounds heads-off weight) were 27 percent below the exceptionally good landings in 1963. However, the ex-vessel value of the 1964 shrimp landings ($18.8 million) was down only 5 percent. White shrimp comprised 73 percent of the 1964 shrimp landings, and brown shrimp 27 percent. Sea bob and royal-red shrimp made up less than 1 percent of the catch. During the early months of 1964, a "wintering over" population of white shrimp yielded profitable catches to fishermen, which exceeded comparable catches in early 1963.

Louisiana Total Landings of Shrimp by Size (Heads-off) and Average Ex-Vessel Prices, 1964 and 1963

Size (heads-off per pound)	1964			1963		
	Landings (heads-off)		Average Price Per Pound	Landings (heads-off)		Average Price Per Pound
	Quantity	Percent of Total		Quantity	Percent of Total	
Number	1,000 Lbs.	%	Cents	1,000 Lbs.	%	Cents
Under 15	827.4	2.2	87.0	259.2	0.5	86.3
15 - 20	4,361.1	11.5	82.3	2,602.2	5.0	89.1
21 - 25	3,260.9	8.6	73.6	3,409.8	6.6	70.6
26 - 30	2,634.7	6.9	63.9	4,080.4	7.9	57.2
31 - 40	6,639.8	17.4	52.3	9,660.6	18.7	47.7
41 - 50	4,171.0	10.9	44.1	5,830.2	11.3	39.6
51 - 67	6,774.0	17.8	36.8	10,209.2	19.8	26.4
68 & Over	9,145.3	24.0	27.6	14,961.0	28.9	18.8
Sea Bobs	280.8	0.7	22.6	689.6	1.3	9.2
Total	38,095.0	100.0	49.3	51,702.2	100.0	38.3

Research conducted by the Louisiana Wild Life and Fisheries Commission indicated that the movements of postlarval brown shrimp into nursery areas in the early spring of 1964 greatly exceeded those of the 1963 banner year. Early hopes for a good brown shrimp crop dwindled, however, when later sampling revealed heavy losses of young brown shrimp from mid-March to mid-April. Below normal water temperatures coupled with low salinity in nursery areas during that period may have been major factors in the shrimp losses.

When the brown shrimp season opened on May 15, catches were disappointing. Catches taken from the inside waters were below normal and far lower than those of 1963. Landings continued at a slow pace until the inside waters closed to trawling on July 15. Large quantities of shrimp were trucked in from neighboring states during that period of low production.

In contrast with the spring brown shrimp failure, the 1964 fall white shrimp season was exceptional--the total ex-vessel value of that catch was at a record level and the quantity of the catch was surpassed only by the 1963 record harvest. Higher prices accounted for the greater value in 1964. The 1964 fall white shrimp season started slowly on August 17 with each succeeding month registering substantial increases through November. White shrimp of the larger sizes made up a greater portion of the 1964 landings than during the previous year. A strong demand resulted in sharp price increases, particularly for smaller-size shrimp.

Oysters: The oyster harvest in 1964 yielded 11.4 million pounds of meats with an ex-vessel value of nearly $3 million. Compared with 1963, that was a decline of 1 percent in quantity and 20 percent in value. The decline in value was due to a poor market for canned oysters coupled with a poor yield of meats. Canning plants used 47 percent of the 1964 Louisiana oyster harvest and produced 198,000 standard cases of canned oysters. The catch was taken by 1,560 fishermen operating 224 vessels (5 net tons and over) and 577 other boats.

Crab: Landings of hard blue crab in 1964 amounted to 5.7 million pounds with an ex-vessel value of $379,000. Compared with the previous year, the 1964 landings were down 29 percent and were the lowest recorded since 1931. The reason for the continuing decline in abundance of blue crab is not known. Louisiana crab plants produced approximately 447,000 pounds of fresh-picked crab meat with a wholesale value of $578,000 in 1964.

Menhaden: The 1964 Louisiana menhaden landings of 599.6 million pounds were down 5 percent from 1963. Hurricane "Hilda" was primarily responsible for the decline. Catches were exceptionally good until late September when "Hilda" approached the northern Gulf area disrupting fishing operations. After the hurricane passed, spotter planes were unable to locate large menhaden schools. As a result, about 6 weeks of fishing were lost. There were 50 vessels employing 900 fishermen engaged in the fishery. Menhaden products produced in Louisiana during 1964 amounted to 63,400 tons of meal, 9.9 million gallons of oil, and 4.5 million gallons of solubles. Plans have been announced for the construction of two new manhaden processing plants in Louisiana, one located at Dulac and the other at Abbeville.

Edible Finfish: Landings of finfish for human consumption in 1964 totaled 15.6 million pounds with an ex-vessel value of $2.6 million--down 8 percent in quantity and 4 per-

cent in value from 1963. Fresh-water catfish, the leading species, with 1964 landings of 7.8 million pounds was valued ex-vessel at $1.8 million--a drop of 10 percent in quantity but a gain of 2 percent in value from 1963. Among the salt-water items, the 1964 landings of red drum (311,700 pounds), spotted sea trout (290,500 pounds), and red snapper (309,900 pounds)--species which ordinarily command the highest prices--were also well below the levels of the previous year. Landings of flounder and king whiting were higher in 1964.

North Atlantic

SOVIET FISHING ACTIVITY OFF COAST, OCTOBER 1965:

Soviet fishing activity on Georges Bank declined during October 1965. The decline was observed by the staff of the Resource Management Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., which conducts weekly reconnaisance flights cooperatively with the U. S. Coast Guard. During the aerial observations in October, a total of 74 Soviet vessels were sighted and identified as 32 fish-factory stern trawlers, 6 "Skryplev-class" processing and refrigerated stern trawlers, 29 "Pioneer-class" side trawlers, 5 refrigerated fish transports, 1 base ship, and 1 fuel and water carrier. That compares to 112 vessels sighted in September 1965 and 47 vessels in October 1964.

Fig. 1 - Soviet refrigerated fish-factory stern trawler of the "Skryplev" class.

Weekly estimates to mid-October 1965 showed that 50 to 60 Soviet vessels were operating in the Georges Bank area. However, by the month's end the number had decreased, temporarily at least, to less than ten. In 1964, Soviet fishing on Georges Bank declined from October until late in November when Soviet stern trawlers and support vessels reappeared, though in fewer numbers.

Fig. 2 - Load of whiting and red hake on the deck of a Soviet stern trawler.

In October 1965, a number of Soviet vessels appeared to have shifted their operations from Georges Bank to eastern Nova Scotia areas. A temporary lag in fish production on Georges Bank may have prompted the move. The Soviets may also have reduced their fleet on Georges Bank in order to recondition vessels that have been operating in the Northwest Atlantic areas since late in the winter of 1965.

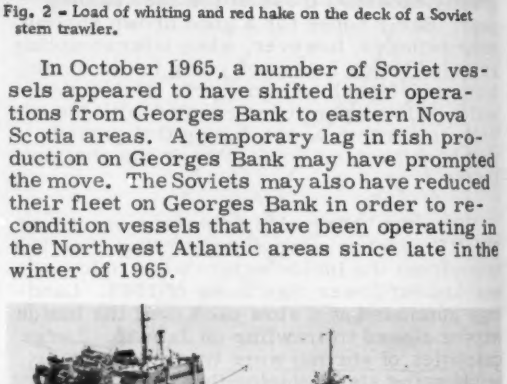


Fig. 3 - Soviet fish transport in North Atlantic.

Soviet fleet operations on Georges Bank during October 1965 were generally confined to the "Southwest Part" and "Southeast Part." Smaller groups and single vessels were widely scattered between the Cultivator Shoals and the "Northern Edge." The majority of vessels were actively engaged in fishing. Heavy to moderate catches of fish observed on decks and in their trawls appeared to contain both whiting and small haddock. Crews on both stern trawlers and large side trawlers continued to cull and dress fish on deck.

Such handling was not seen prior to 1965 and has raised questions as to the type of processing being done. The Soviets did not emphasize herring fishing during 1965. Previously, herring ranked either first or second in their total fish catch on Georges Bank.

In addition to Soviet activity, two Rumanian stern trawlers were sighted on Georges Bank.

Several Polish stern trawlers previously reported were not sighted during October.

Note: See Commercial Fisheries Review, Nov. 1965 p. 32.

North Atlantic Fisheries Investigations

LOBSTER AND SEA HERRING POPULATIONS AND LARVAE STUDIED: M/V "Delaware" Cruise 65-11 (September 27-October 6, 1965): Lobster and herring investigations were conducted during this cruise in the North Atlantic Ocean (northern part of Georges Bank, Corsair, Veatches, and Hudson Canyons) by the U. S. Bureau of Commercial Fisheries research vessel Delaware. Objectives were to: (1) sample sea herring and lobster populations and obtain related environmental data, (2) obtain lobster blood samples, and (3) make plankton tows for herring and lobster larvae.

FISHING OPERATIONS: Herring: Six herring trawl sets were made at designated stations. The sets (1 hour each) made in waters of 35 to 40 fathoms yielded a total of 22 bushels (1,600 pounds). The herring obtained were from 24.7 to 36.1 centimeters (9.4 to 14.2 inches) long. The 1960 year-class was dominant in the catches, followed in percentage occurrence by the 1961 year-class. Examination of gonadal development showed that many of the herring had recently spawned. Herring that had not spawned were in a late stage of gonadal development. Species of fish obtained, other than herring, were scrod haddock (52 bushels), butterfish (1 bushel), lemon sole (1 bushel), whiting (3 bushels), cod (1 bushel), hake (3 bushels), and cunner (1 bushel).

Lobster: A total of 9 trawl sets were made at the 2 lobster stations worked. The sets made in waters ranging from 55 to 150 fathoms yielded 78 lobsters (37 females and 41 males). Only one lobster was soft-shelled. All lobsters caught were from waters of eastern Veatches Canyon (55 to 70 fathoms). The average weight of the lobsters was about $1\frac{1}{2}$ pounds, and the range in weight was from $\frac{1}{8}$ to 12 pounds. A total of 25 blood samples were obtained for analysis.

PLANKTON OPERATIONS: Herring: Eleven 1-meter net plankton tows lasting 15 minutes each (5 minutes at 10 meters, 5 minutes at 5 meters, and 5 minutes at the surface) were made during the cruise. A total of 390 yolk-sac larvae with an average length of 6.5 millimeters or about 0.2 inches was obtained at one station and 8 yolk-sac larvae of the same average length were obtained at another station. Larvae obtained at other stations measured 0.6 and 0.7 inches long. Lobster: Two 1-meter net plankton tows of 15 minutes each (at the surface) were made during the cruise, but no lobster larvae were obtained.

HYDROGRAPHIC OBSERVATIONS: Five sea-bed drifters and 5 drift bottles were released at hydrographic stations, and at each station bathythermograph (BT) casts were made, surface salinities collected, and weather observations recorded.

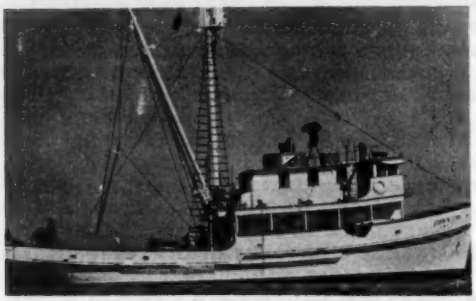
Note: See Commercial Fisheries Review, November 1965 p. 31.

North Pacific Fisheries Explorations and Gear Development

HAKE POPULATION SURVEY CONTINUED: M/V "John N. Cobb" Cruise 73 (August 30-October 1, 1965): This five-week pelagic exploratory cruise for Pacific hake (Merluccius productus) along the coast of California by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb was conducted cooperatively with the Bureau's biological and technological laboratories at Seattle, Wash., and with the California Department of Fish and Game.

To determine the geographic and bathymetric distribution of schools of hake along the California coast during the month of September was the primary objective. Secondary objectives were to: (1) obtain biological data on that species, and (2) obtain additional data relative to the catching efficiency of the Mark II "Cobb" pelagic trawl.

GEAR USED: The principal gear used was a standard Mark II "Cobb" pelagic trawl con-



Exploratory fishing vessel John N. Cobb.

structed of 3-inch mesh multifilament webbing. It was fished with the standard two aluminum hydrofoil-type otter boards on 60-fathom bridles. A 12-foot liner constructed of $\frac{9}{16}$-inch mesh webbing was placed in the cod end of the net to retain small fish. A high-resolution, low-frequency echo-sounder was used to locate the fish and a dual electrical depth-telemetering system was used to monitor the fishing depth of the net.

METHODS OF OPERATION: Onshore-offshore echo-sounding transects were made at oblique angles to the coast between the 30- and 200-fathom contours. When hake were observed on the echo-sounder, closely spaced echo-sounding transects coupled with pelagic trawl hauls were made to determine the size of the schools. Length frequency, maturity, and sex ratio data were obtained from random samples of the catch. A bathythermograph (BT) cast was made after each haul, and plankton and bottom sediment samples were taken at selected localities.

RESULTS: The region surveyed with the echo-sounder extended along the California coast from its northern border to Santa Barbara Channel. Hake were found in two areas--off Fort Bragg and off Bodega Head. The sounding transect made off Fort Bragg, which is some 120 miles north of San Francisco, indicated the presence of a moderately large school of hake near the 70-fathom depth contour. The school was about 2 miles wide and 10 miles long. An hour haul made through the school yielded a catch of 21,000 pounds of hake. Two distinct size groups of hake were taken in the haul--a small group with a mode at 28 centimeters (11.0 inches), and a larger group with a mode at 44 centimeters (17.3 inches). Hake taken in past explorations off the Washington coast were represented by a single size group of modal length 54 centimeters (21.3 inches); those caught off Oregon were made up of two size groups with modal lengths of 44 and 51 centimeters. The only area other than California where small hake have been taken was in Puget Sound, Wash.

Sounding transects made off Bodega Head (about 40 miles north of San Francisco) indicated a number of small scattered hake schools were present along the 90- to 130-fathom contours. Hour hauls made through such schools generally yielded from 800 to 9,000 pounds of hake; one haul yielded 30,000 pounds. The largest haul occurred when the pelagic trawl was fished through several closely adjoining small schools. Hake caught off Bodega Head were similar in size to those taken off Fort Bragg.

Ten tons of hake were delivered for testing purposes to a reduction plant in San Francisco, Calif. Samples of the fish meal produced were to be analyzed by the Bureau's Seattle Technology Laboratory.

Note: See Commercial Fisheries Review, October 1965 p. 45.

Oceanography

COAST GUARD CUTTER "NORTHWIND" COMPLETES MAJOR STUDY IN SIBERIAN ARCTIC:

In early October 1965, the U. S. Coast Guard cutter Northwind completed an intensive oceanographic study in relatively unexplored Arctic waters north of the Soviet Union.

During her 2-months stay in the Arctic above the Soviet Union, the Northwind became the first United States oceanographic vessel to traverse the Kara Sea. Soviet destroyers stayed near the Northwind during much of the voyage, but did not interfere. The study was conducted in cooperation with the Intergovernmental Oceanographic Commission (IOC) of the United Nations. The information gathered by the Northwind will be made available to World Data Center A for Oceanography in Washington, D. C. World Data Center B is in Moscow. The two centers exchange oceanographic information.

During the Arctic cruise, the Northwind gathered information at 132 sampling stations on water temperature, salinity, dissolved oxygen, and nutrients. Bottom core

samples were taken at about half of the observation points. The core samples will be examined, among other things, for evidence of radioactivity.

The cruise also provided useful data on ocean currents in the far north region. Geological characteristics of the sea bottom in the area were determined by measuring shock waves set up by small underwater explosions.

The scientific party aboard the Northwind consisted of teams from the U. S. Naval Oceanographic Office, and the Geophysical and Polar Research Center of the University of Wisconsin.

After completing the Arctic cruise, the Northwind called at Oslo, Norway, and then sailed on October 10, 1965, for New York City and her home port of Seattle, Wash. The vessel had begun the cruise about 3½ months earlier when it sailed from New York City on June 27, 1965. Before entering the Arctic, the Northwind carried out a North Atlantic study (from the southern tip of Greenland to Iceland to Scotland) in order to monitor boundary conditions affecting the circulation between the North Atlantic Ocean and the Arctic Basin.

The cruise of the Northwind should make a major contribution to the world's knowledge of northern waters.

Note: See Commercial Fisheries Review, Sept. 1965 p. 40.

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"SEA LAB II" REPORT WILL BE FEATURED AT SYMPOSIUM IN WASHINGTON, D. C.:

"Man's Extension into the Sea" is the theme of a 2-day symposium to be held in Washington, D.C., January 11-12, 1966. Sponsored by the Navy and six professional societies, the meeting will feature a report on the Navy's Sea Lab II experiment.

The Sea Lab II experiment began Aug. 27, 1965, at an underwater site about one-half mile off the coast of La Jolla, Calif. During a 45-day period, 3 groups of 10 men lived and worked for 15 days each at a depth of 205 feet in a 57-foot long undersea habitat. The aquanaut teams were made up of both Navy divers and civilian scientists. Sea Lab II is the second phase of the Navy's "Man-in-the-Sea" program.

After a special 30-day stay in Sea Lab II, Astronaut-Aquanaut Scott Carpenter said the second 2 weeks are the easiest because it takes some time to become conditioned and acclimated to the high-pressure living.

The symposium will cover many details of Sea Lab II such as aquanaut experiences, engineering problems, medical problems, training, logistics, communications, photography, scientific experiments, and instrumentation. Registration fee for the meeting is $6.00, which includes admittance to all sessions and a bound copy of the proceedings.

For additional information about the meeting contact Charles W. Covey, Undersea Technology, 617 Lynn Building, 1111 N. 19th Street, Arlington, Va. 22209. Telephone (area code 703) 524-3136.

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CONFERENCE AND EXHIBIT TO BE HELD IN WASHINGTON, D. C., IN JUNE 1966:

The Marine Technology Society has announced plans for its 2nd Annual Conference and Exhibit to be held at the Sheraton-Park Hotel in Washington, D. C., June 27-29, 1966. Plans for the 1966 meeting were made after the success of the 1965 Ocean Science and Engineering Conference and Exhibit in Washington.

The theme of the 1966 Conference and Exhibit is "Exploiting The Ocean." The 3-day event will include over 70 presentations emphasizing both the opportunities and the problems on the marine frontier as industrial firms and Government agencies expand their programs to explore and use the vast resources of the world oceans.

The conference program will include papers on commercial fisheries, offshore drilling, chemical extraction from sea water, and ocean floor mineral recovery. Special attention will be given to the effect of State, Federal, and international maritime laws on all of those growing areas of oceanography.

Those interested in information on exhibit space at the meeting should contact Trade Associates, Inc., 5151 Wisconsin Ave. NW., Washington, D. C. 20016, Att.: Frank Masters.

For information on the conference and technical program write: Executive Secretary, Marine Technology Society, 1030 15th Street NW., Washington, D. C. 20005.

Note: See Commercial Fisheries Review, August 1965 p. 49.

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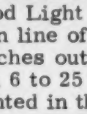
STUDY OF UNMANNED BUOYS OFF MASSACHUSETTS:

The U. S. Bureau of Commercial Fisheries and the Coast Guard are cooperating in an experiment with unmanned oceanographic buoys off Cape Cod Light in Massachusetts waters. A section line of five orange-and-white buoys stretches out to sea for 3 miles. At depths of from 6 to 25 fathoms, sensitive instruments mounted in the buoys' concrete mooring blocks record temperatures and pressures existing on different types of ocean bottom. Those instruments are capable of recording data at hourly intervals for a continuous period of 400 days.

While the instruments are in operation, Bureau scientists will collect samples of marine animals in the vicinity of the buoys. From the analysis of the samples and of the data recorded by the instruments, they will learn more about the influence of water temperature on the distribution, abundance, and life history of a variety of marine life.



Oysters

VIRGINIA SCIENTIST RECEIVES GRANT FOR MSX STUDIES:

The National Science Foundation has awarded a $2,000 grant to finance continued research on MSX by the head of the biology department of Madison College, Harrisonburg, Va. The grant will allow the scientist to continue research during the academic year 1965/66 into the effect of MSX on respiration of oysters. He spent the summer of 1965 in a research program for college teachers sponsored by the Virginia Institute of Marine Science, where he measured the level of three enzymes and their relationship to respiration in oysters free of disease as opposed to those suffering from infection. He is interested in determining whether enzyme leakage is useful in diagnosing infections in oysters caused by MSX. Incidental to his primary study, he discovered that respiration in oysters practically ceases when the dinoflagellate bloom ("red tide") occurs in the York River. (Virginia Institute of Marine Science, October 20, 1965.)

Transportation

AIRLINE CUTS RATES 40 PERCENT ON NORTHWEST FISHERY SHIPMENTS TO EASTERN POINTS:

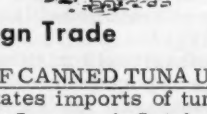
United Air Lines has cut rates 40 percent on perishable shipments of fish and fishery products moving from the Pacific Northwest to major midwestern and eastern markets.

The airline supported its rate reduction by revising jet freighter flight schedules. The schedule revision provides for the addition of a nonstop jet freighter flight every Sunday between Seattle and New York and a jet freighter flight every weekday between Seattle and New York with stops at Chicago and Philadelphia. The rate cut became effective September 12, 1965. The revised flight schedules were to go into effect October 12.

Announcing the 40-percent rate cut in September 1965, United's manager of perishable sales described it as a "one-year experimental rate reduction" and said, "seafood will move from Seattle, Portland, and Vancouver, B. C., to New York at $9 a hundredweight for a 2,000-pound shipment compared with the old rate of $15.05. The rate to Chicago dropped from: $11.10 a hundredweight to $7.50."

Destination cities covered by the new rates include Boston, Baltimore, Cleveland, Detroit, Kansas City, Milwaukee, Philadelphia, Pittsburgh, and Washington, D. C., in addition to New York and Chicago. (Traffic World, September 18, 1965.)

Note: See report on plastic fish boxes particularly adapted to air shipment on pages 21 & 22 of this issue.



U. S. Foreign Trade

IMPORTS OF CANNED TUNA UNDER QUOTA:

United States imports of tuna canned in brine during January 1-October 2, 1965, amounted to 35,332,411 pounds (about 1,682,500 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 10.8 percent from the 31,894,583 pounds (about 1,518,800 standard cases) imported during January 1-October 3, 1964.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty is limited to 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz.

cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

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AIRBORNE IMPORTS OF FISHERY PRODUCTS, JANUARY-JUNE 1965:

Shrimp from Venezuela continued to be the main airborne fishery import into the United States during the second quarter of 1965. In January-June 1965, airborne imports of fishery products into the United States totaled 9.3 million pounds with a value of $5.2 million. That was almost 2.5 times greater than the airborne fishery imports in the first half of 1964 when smaller quantities of shrimp were shipped by air from Venezuela.

U.S. 1/ Airborne Imports of Fishery Products, April-June 1965 and January-June 1965 with Comparative Data

Product and Origin 2/	Apr.-June 1965		Jan.-June 1965		Jan.-June 1964	
	Qty. 3/	Value 4/	Qty. 3/	Value 4/	Qty. 3/	Value 4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
Fish:						
All countries	251.1	250.0	481.7	480.2	264.4	87.1
Shrimp:						
Venezuela	3,171.8	1,601.5	7,718.3	3,926.5	2,162.1	984.1
Panama	222.8	145.8	592.4	370.9	512.1	309.4
Costa Rica	75.9	35.6	104.8	50.2	188.3	108.1
El Salvador	10.7	6.0	28.1	19.1	159.1	96.8
Other countries	0.4	0.6	54.5	30.4	83.3	47.5
Total shrimp	3,481.6	1,789.5	8,498.1	4,397.1	3,104.9	1,545.9
Shellfish other than shrimp:						
Canada	23.3	8.3	23.9	8.7	207.8	113.0
Mexico	0.8	0.7	1.2	1.0	9.0	4.8
British Honduras	21.7	5.5	76.2	57.5	82.8	50.4
Honduras	5.4	1.3	15.6	5.7	12.9	9.4
Nicaragua	33.4	18.0	104.1	412.0	50.5	40.0
Costa Rica	-	-	13.9	13.3	9.3	9.5
Jamaica	16.3	19.8	25.8	35.7	43.6	36.2
Other countries	13.6	11.5	109.2	77.2	39.0	15.2
Total shellfish (except shrimp)	114.5	65.1	369.9	311.1	454.9	278.5
Grand total	3,847.2	2,104.6	9,349.7	5,188.4	3,824.2	1,911.5

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipment is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U.S. import duties, air freight, or insurance.
Note: These data are included in the overall import figures for total imports, i.e., those imports are not to be added to other import data published.
Source: United States Exports & Imports by Air, FT 785, January through June 1965, U.S. Bureau of the Census.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

Washington

TEST HERRING FISHERY OPENED OFF WHIDBEY ISLAND:

The opening of a test fishery for herring off the west coast of Whidbey Island in Puget Sound was announced October 8, 1965, by the Washington State Department of Fisheries. The area opened is that portion of Puget Sound herring fishing Area No. 1, lying easterly or inside of a line from Partridge Point on Whidbey Island to Smith Island Light to West Point on Whidbey Island.

The fishery began October 11 and was scheduled to continue (with weekend closures) until a quota of 1,000 tons was reached. The abundance of herring in the West Beach area of Puget Sound is sufficiently large to justify such a catch, and the fish are in prime condition, fat, and very high in oil content. Such herring provide a superior product for reduction into oil and meal, as well as for processing into pickled herring, fish pellets, animal food, and bait.

The Washington State Department of Fisheries has released tagged herring off Whidbey Island and will assess tag recoveries to determine migration patterns. (Washington State Department of Fisheries, October 8, 1965.)

Wholesale Prices

EDIBLE FISH AND SHELLFISH, OCTOBER 1965:

From September to October 1965 prices were up for only several items (haddock and haddock fillets, shrimp, and oysters) in the index. At 118.0 percent of the 1957-59 average, the overall wholesale price index for edible fishery products in October rose 1.5 percent from the previous month. Compared with the same month in 1964, the index this October was up 5.7 percent because prices were up substantially for large haddock and haddock fillets, fresh shrimp, oysters, and canned salmon and jack mackerel.

In the subgroup for drawn, dressed, or whole finfish, prices from September to October were down 2.9 percent--all items were priced lower except ex-vessel large haddock. With the end of the seasonal North Pacific fisheries for halibut and salmon, the frozen form of those species at New York City were priced lower than the fresh product. October prices at New York City for Great Lakes round yellow pike dropped 35.8 percent from the Jewish Holiday prices of the previous month; prices at Chicago for Lake Superior fresh whitefish were down 8.7 percent. Large haddock prices at Boston were exceptionally high (up 27.4 percent from September to October and

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1965 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Oct. 1965	Sept. 1965	Oct. 1965	Sept. 1965	Aug. 1965	Oct. 1964
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					118.0	116.2	114.3	111.6
Fresh & Frozen Fishery Products:					121.7	117.9	117.4	116.6
Drawn, Dressed, or Whole Finfish:					131.9	135.8	133.4	133.4
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.23	.18	181.0	142.1	147.7	135.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.51	142.0	150.8	149.4	164.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.84	.94	117.0	131.0	127.5	134.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.53	.58	78.3	85.8	94.8	79.8
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.61	.95	99.9	155.5	114.6	77.8
Processed, Fresh (Fish & Shellfish):					119.1	107.3	108.8	106.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.49	.48	119.0	116.6	99.6	97.1
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.87	.80	101.4	93.7	100.8	96.7
Oysters, shucked, standards	Norfolk	gal.	8.38	7.25	141.2	122.3	120.2	120.1
Processed, Frozen (Fish & Shellfish):					107.6	105.3	104.8	104.7
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	100.1	100.1	98.8	91.2
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.38	117.3	111.4	111.4	109.9
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.31	.31	107.0	108.7	108.7	103.4
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.87	.86	102.6	101.4	100.8	103.2
Canned Fishery Products:					113.0	113.7	109.4	103.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	27.00	27.00	117.7	117.7	106.8	94.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.56	102.6	102.6	102.6	102.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	9.50	10.00	121.9	128.3	131.5	128.3

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

33.6 percent higher than in October 1964) because of light catches. As compared with the same month a year earlier, the subgroup index this October was down 1.1 percent; except for large haddock, prices were lower for all items.

October prices were higher by 11.0 percent from the previous month for all items in the fresh processed fish and shellfish subgroup. Prices for standard shucked oysters at Norfolk were up 15.5 percent because of limited production. At New York City, wholesale prices for South Atlantic fresh shrimp were substantially higher (up 7 cents a pound), and there was some increase in prices at Boston for small haddock fillets. The subgroup index this October was up 11.8 percent as against the same month in 1964. October 1965 prices were much higher for haddock fillets (up 22.6 percent) and for shucked oysters (up 17.6 percent) than in the same month a year earlier.

Higher prices from September to October for frozen haddock fillets (up 5.3 percent) at Boston and for frozen shrimp (up 1.2 percent) at Chicago were responsible for a 2.2-percent rise in the subgroup index for frozen processed fish and shellfish. October prices for ocean perch fillets were about the same as in September while those for flounder fillets remained unchanged but were 9.8 percent higher than in October a year earlier. Compared with October 1964 the subgroup index this October was up 2.8 percent because of higher prices for all items.

Prices for canned fish were generally steady during October and mostly unchanged from the previous month. But lower prices from September to October for canned Maine sardines (down 5.0 percent) were responsible for a 0.6-percent drop in the subgroup index for canned fishery products. Canned Maine sardines were in better supply than a year earlier, with the 1965 pack as of the end of October topping the previous year's pack by nearly 50 percent. The subgroup index this October was 9.6 percent higher than in October 1964--prices for canned salmon were up 24.2 percent and for California jack mackerel up 14.2 percent. Canned tuna prices were the same as in October 1964.

International

FISH MEAL

PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-JULY 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, Jan.-July 1965

Country	July		Jan.-July	
	1965	1964	1965	1964
	(1,000 Metric Tons)			
Chile	1.0	14.4	51.3	87.0
Angola	2.8	1.9	27.2	32.1
Iceland	14.7	13.4	64.2	66.4
Norway	24.5	12.0	117.3	121.0
Peru	110.4	141.6	1,029.5	912.0
So. Africa (including S.-W. Africa)	20.2	20.2	132.7	127.2
Total	173.6	203.5	1,422.2	1,345.7

Table 2 - Production of Fish Meal by Member Countries of the FEO, Jan.-July 1965

Country	July		Jan.-July	
	1965	1964	1965	1964
	(1,000 Metric Tons)			
Chile	2.2	6.3	47.1	97.3
Angola	3.0	1.0	23.7	31.5
Iceland	14.0	20.3	67.7	73.2
Norway	46.2	15.0	189.8	114.9
Peru	12.4	83.8	892.7	953.5
So. Africa (including S.-W. Africa)	39.4	30.2	231.6	189.4
Total	117.2	156.6	1,452.6	1,459.8

Peru accounted for about 72 percent of the 1.4 million metric tons of fish meal exported by FEO countries in January-July 1965.

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WORLD PRODUCTION, JULY 1965 WITH COMPARISONS:

World fish meal production in July 1965 was down 29 percent from the previous month due mainly to extremely poor production in Peru.

World Fish Meal Production by Countries, July 1965 with Comparisons

Country	July		Jan.-July	
	1965	1964	1965	1964
	(Metric Tons)			
Canada	7,547	8,778	44,059	30,712
Denmark	10,233	11,703	65,446	53,553
France	1,100	1,100	7,700	7,700
German Fed. Repub.	6,516	5,621	38,161	42,898
Netherlands	518	500	3,375	4,000
Spain	1/	1/	2/13,247	1/
Sweden	113	164	4,482	3,830
United Kingdom	7,588	6,985	48,161	47,268
United States	43,955	40,975	123,790	128,637
Angola	2,988	956	23,743	31,498
Iceland	14,010	20,284	67,689	73,163
Norway	46,153	15,020	189,789	114,855
Peru	12,434	83,798	892,653	953,480
So. Afr. (including S.-W. Afr.)	39,505	30,419	232,822	190,012
Belgium	375	375	2,625	2,625
Chile	2,228	6,318	47,142	97,298
Morocco	1/	2,290	2/ 1,100	9,050
Total	195,263	235,286	1,805,984	1,790,579

1/Data not available.
2/Data available only for January-May 1965.
Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

World fish meal production in January-July 1965 was about the same as that in the first 7 months of 1964. Peru accounted for about 49 percent of total output in January-July 1965. Most of the principal countries producing fish meal submit data to the International Association of Fish Meal Manufacturers monthly (see table).

FOOD AND AGRICULTURE ORGANIZATION

DESIGNING WITH COMPUTERS DISCUSSED AT THIRD INTERNATIONAL TECHNICAL MEETING ON FISHING VESSELS:

The use of electronic computers in designing fishing vessels was to be one of the major themes discussed at the Food and Agricul-

International (Contd.):

ture Organization's (FAO) 3rd International Technical Meeting on Fishing Boats, which was scheduled to meet in Goteborg, Sweden, October, 23-29, 1965.

FAO, in cooperation with the British National Physical Laboratory at Teddington, has designed 40- to 85-foot fishing vessels with the help of a computer. From such designs, models of 40-, 55-, and 70-foot vessels have been built and tested extensively at the Teddington Laboratory. All three models performed as the computer said they would, according to the Chief of FAO's Fishing Boat Section. He said, "They did just what we designed them to do. We think this proves the computer system for designing small boats definitely works." A model of the fourth FAO computer-designed vessel, an 85-footer, was to be built and tested in Sweden. A paper on the computer-design program was prepared for presentation at the Goteborg meeting.

Some 300 participants from about 40 countries were expected at the meeting, and about 30 technical papers were to be presented. The program of the meeting was planned to emphasize the needs of the developing countries for smaller fishing craft--vessels under 100 gross tons--especially adaptable to their local waters. "What we hope to accomplish," said the Chief of FAO's Fishing Boat Section, "is to come up with ideas and recommendations that will enable us to set better standards for designing the smaller boats. The importance of these smaller craft, after all, is simply that they so greatly outnumber the larger boats in the world fisheries picture. They have an importance that cannot be overlooked if fishing is to progress in both the developing and developed nations." (Food and Agricultural Organization, Rome.)

Note: See Commercial Fisheries Review, Aug. 1965 p. 128, and May 1965 p. 50.

LAW OF THE SEA

CONVENTION ON THE CONTINENTAL SHELF RATIFIED BY FRANCE:

On June 14, 1965, accession to the Convention on the Continental Shelf was deposited by France (with declarations and reservations). The Convention entered into force June 10, 1964. It is one of the Conventions formulated at the United Nations Conference on the Law of the Sea at Geneva on April 29, 1958.

Note: See Commercial Fisheries Review, May 1965 p. 55.

NORDIC COUNTRIES

FISHING ORGANIZATIONS MEET TO DISCUSS FISHING LIMITS:

Nordic fishing industry organizations, which met in Oslo during September 1965, were reported nearer to agreement on appropriate fishing limits between Denmark, Norway, and Sweden. A new meeting was scheduled for October in Stockholm at which final agreement was expected, according to Danish reports. A modification in the Norwegian viewpoint on limits in the Kattegat and Skagerrak was expected to satisfy both Denmark and Sweden. Once the fishing industry organizations have reached agreement, representatives of the respective governments were expected to meet so that the new limits may be established without too much delay. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, September 22, 1965.)

Note: See Commercial Fisheries Review, September 1964 p. 54.

NORTH SEA

SPECIAL FISHERY CHARTS PUBLISHED:

The Danish Hydrographic Office, in cooperation with similar institutions in Great Britain, the Netherlands, West Germany, Norway, and Sweden, has been preparing a series of 59 special fishery charts to cover the North Sea from south of the English Channel to north of Bergen, Norway. Sixteen of the 28 charts for which Denmark is responsible were to be made available in fall 1965. Fishermen may choose from three different versions of the charts according to the Decca chain used. The charts are half the size of the current navigating charts and overlap each other. Each chart covers 1 degree of latitude and 2 degrees of longitude. The Netherlands has published 6 charts, Norway and Great Britain 3 each, and West Germany 2. The uniform price in each country is equivalent to 10 Danish kroner (US$1.45) per chart. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, September 22, 1965.)

WEST EUROPEAN FISHERY CONFERENCE

MEETING IN THE HAGUE, SEPTEMBER 1965:

On September 28-29, 1965, a meeting was held in The Hague of the West European Fishery Conference (WEFC) comprising national fishery organizations of Belgium, Denmark, the United Kingdom, France, the German Federal Republic, Norway, Portugal, Spain, Sweden, and the Netherlands.

International (Contd.):

Delegates to the meeting reviewed West European fisheries and considered some of the problems that might arise in the future, according to a report in the Netherlands Fishery Federation periodical De Visserijwereld, September 30, 1965.

Concern was expressed over the combined effect of the fishery development plans of various countries. It was felt that, in the aggregate, those plans could lead to excess fishing capacity. That in turn could lead to overfishing in the Atlantic and excess supplies or market gluts at European ports. Landings by non-European vessels in European ports might complicate the problem. The delegates agreed that such problems could not be solved at the WEFC meeting, so further study of the situation was recommended.

The Conference considered the question as to whether some coordination of the meetings of the Northeast Atlantic Fisheries Commission and the International Commission for the Northwest Atlantic Fisheries would be desirable. There was also a discussion of boxing fish at sea onboard fishing vessels. (United States Embassy, The Hague, October 12, 1965.)

OCEANOGRAPHY

SOVIET GROUP VISITS U. S. UNDER SCIENTIFIC EXCHANGE PROGRAM:

Six oceanographers from the Soviet Union arrived in the United States in September 1965 for a four-week tour of American oceanographic installations as a part of the United States-Soviet technical and scientific exchange program. The Soviet scientists are returning a visit made by six American oceanographers to Russia in September-October 1964.

The Coast & Geodetic Survey of the U. S. Department of Commerce acted as their host during the scientists' stay in this country. After visiting the oceanographic World Data Center and the Coast & Geodetic Survey at Washington, D. C., they visited 10 oceanographic installations in New York, Massachusetts, Florida, Texas, Oregon, and Washington.

* * * * *

JOINT SOVIET-NORWEGIAN EXPEDITION:

A joint Soviet-Norwegian oceanographic expedition started from Murmansk on September 1, 1965. Increased oceanographic cooperation between the two countries is expected to result. The object of the expedition was to coordinate methodology and instrumentation and to develop a joint system of deciphering data collected. The research chief of the State Marine Biological Station at Tromsø, Norway, and three other Norwegian oceanographers participated in the expedition.

With those aims achieved, the Soviet and Norwegian oceanographic vessels would be able to make separate and joint observations of value to both parties. During the September expedition, which was planned to last two weeks, the Soviet and Norwegian oceanographers were to make the same observations operating together in the same waters. On completion of the expedition, the scientists were to meet in Tromsø to work out a joint report on data collected.

Two Norwegian oceanographic vessels, the G. O. Sars and the Johan Hjort took part in the expedition. (United States Embassy, Oslo, August 1, 1965.)

U. S.-MEXICAN EXCHANGE OF SCIENTIFIC FISHERY DATA

As part of the observance of International Cooperation Year, the Bureau of Commercial Fisheries, U. S. Department of the Interior, has developed a program with Mexico, enabling the two nations to exchange scientific knowledge through an exchange of fishery biologists.

Two Mexican fishery biologists, one from Campeche and the other from Tampico, visited the Bureau's Biological Laboratory in Galveston, Tex., during fall 1965 to observe United States methods of shrimp research. Arrangement were also completed for other Mexican scientists to visit Bureau laboratories in La Jolla, Calif., and Seattle, Wash. The Bureau plans to send United States biologists to Mexico to study latest research procedures in that country.

The visiting scientists at the Galveston laboratory observed methods of identifying and sampling shrimp in the larval, postlarval, and juvenile stages in estuaries (areas where salt and fresh water meet). Those studies are vital in estimating and forecasting future shrimp crops. Shrimp is the most valuable resource taken by United States fishermen, and the shrimp industry ranks near the top of the Mexican economy.

Angola

FISHING INDUSTRY IN ANGOLA ATTRACTS INVESTMENTS FROM THE SOUTH AFRICA REPUBLIC:

A firm in the South Africa Republic has completed negotiations to enter the fishing industry at the Angolan port of Mocamedes. That represents the fourth investment in the Angolan fishing industry by firms in the South Africa Republic during the first 9 months of 1965. (United States Consulate, Luanda, September 24, 1965.)

Note: See Commercial Fisheries Review, March 1964 p. 40.

Australia

FROZEN EELS EXPORTED:

Eels fished by both Australian and New Zealand fishermen are being frozen and exported to European countries, including Great Britain, where they are a delicacy.

In Victoria, Australia, it is a new export industry. More than 10,000 pounds of eels, caught in lakes and streams in western Victoria during summer 1965, were sent to freezing plants where they were processed for export. The idea of the new enterprise started when it was learned there was a serious shortage of eels in Holland because of stream pollution.

A firm in Auckland, New Zealand, is exporting about 100 tons of eels a year to Europe. Another firm has received a large order valued at about US$85,000 from a European buyer.

The manager of one of the New Zealand fishery export firms said retail prices for eels in Europe were quite high. His company exports silver-bellied long-finned eels weighing from ½ to 2 pounds each. They are deslimed and either block frozen or gutted and frozen packed in polythene bags, depending on how the customer wants them. (Fish Trades Gazette, July 24 and 31, 1965.)

* * * * *

NEW TUNA VESSEL "KARINA G" LAUNCHED:

The Karina G, launched in July 1965, is the largest tuna clipper yet built in Australia. It has a hold capacity for 100 short tons of frozen tuna, and it carries bait tanks with a capacity of 22 tons. It is also the first fishing vessel constructed with the assistance of the Australian Government's shipbuilding subsidy. (Under that scheme, vessels of over 200 tons may be subsidized for the amount necessary to equate the price of the locally built vessel with the estimated cost of the vessel had it been purchased from the United Kingdom, or a maximum of 33.5 percent of the cost to build it in Australia, whichever is less.)

The Karina G was built for an experienced Australian tuna fishing company which plans to use the vessel for tuna fishing off New South Wales and South Australia and in the Tasman Sea.

The vessel will be capable of maintaining a speed of between 9.5 and 10 knots at sea in ordinary weather when fully loaded. Principal dimensions (approximate) are: length overall 92 feet, length between perpendiculars 79 feet, breadth moulded 26 feet, and depth moulded 13 feet. Accommodations are provided for a crew of 11.

The main diesel engine is a turbo-charged aftercooled marine propulsion engine having a continuous rating of 765 brake horsepower at 1,225 r.p.m., and driving a 5-bladed fixed-pitch propeller through a standard reverse reduction gear box with a ratio of 3.95 : 1.

The gearbox is equipped with a special trolling valve for low-speed operation of the propeller.

When running, the engine can be remotely controlled from the wheelhouse or the open fishing bridge but the engine must be started and stopped from the engineroom.

A refrigerated brine recirculating system using ammonia for cooling has been installed to freeze and refrigerate the tuna catch.

The vessel is fitted with radar, echo-sounder, videograph, automatic pilot, two-way radio, and a seawater temperature recorder.

The word "Karina" in the name of this vessel is an aboriginal word meaning wife, and it is the firm belief of the owners that they will be "wedded" to their new vessel. (Australian Fisheries Newsletter, September 1965.)

Canada

FISHERY FIRM EXPORTS FRESH-WATER FISH TO WESTERN EUROPE:

A fishery firm in Winnipeg, Manitoba, expects to export in 1965 from 300,000 to 400,000 pounds of northern pike (pickerel) and whitefish to countries in Western Europe. The firm's increasing orders are the result of a 5-week tour in nine European countries by the company's president during spring 1965.

The firm is relatively new and was established to export to the European market after noting the reaction to a Manitoba fishery exhibit at a London food fair a year earlier. Because of European interest in Manitoba-produced fishery products, officials of two other Canadian fishery firms decided to join in forming a new company for exporting to European countries. (United States Embassy, Ottawa, October 13, 1965.)

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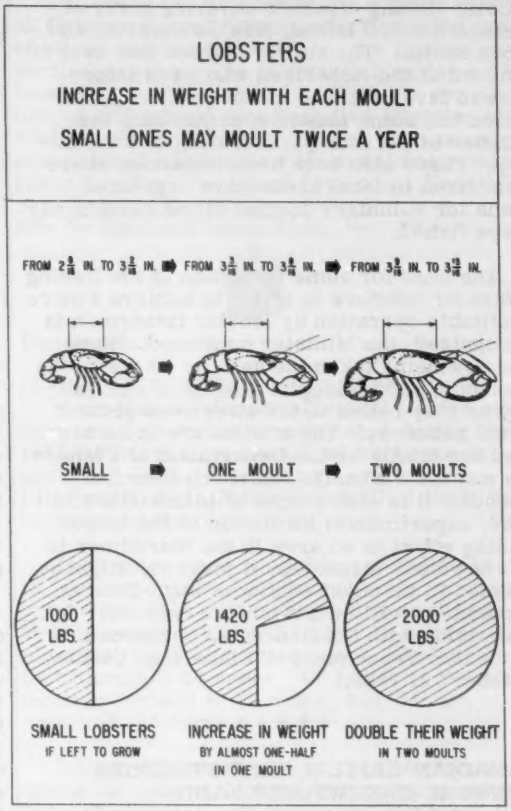
MORE EFFECTIVE MANAGEMENT OF ATLANTIC LOBSTER STOCKS PROPOSED:

Increased investigation into the possibility of easing the fishing effort on the lobster stocks of the Atlantic coast will get under way in 1966, announced the Canadian Fisheries Minister on October 12, 1965. He said he was very interested in the proposal put forward at a recent meeting of the Federal Provincial Atlantic Fisheries Committee that there be an experimental study in a given area to see if an effective means might be found to improve the financial returns to fishermen for the effort they put into that fishery.

There is a fairly fixed supply of lobster that can be taken from present populations. Among other purposes, regulations governing lobster fishing are directed to ensure a maximum yearly yield without diminishing subsequent crops. These generally fixed supplies, coupled with a strong and increasing demand, have led to rising prices for that species.

Generally, the lobster fishery is open to any person who can pay the nominal license fee. Fishery economists have pointed out that under such circumstances, there is increasing pressure on the lobster stocks with more fishermen using more boats and more traps. It has been suggested that the rise in operating costs to fishermen may be equal to or greater than the increase in value they receive.


LOBSTERS
INCREASE IN WEIGHT WITH EACH MOULT
SMALL ONES MAY MOULT TWICE A YEAR
FROM 2 5/16 IN. TO 3 1/16 IN.
FROM 3 3/16 IN. TO 3 9/16 IN.
FROM 3 7/16 IN. TO 3 13/16 IN.
SMALL
ONE MOULT
TWO MOULTS
1000 LBS.
1420 LBS.
2000 LBS.
SMALL LOBSTERS IF LEFT TO GROW
INCREASE IN WEIGHT BY ALMOST ONE-HALF IN ONE MOULT
DOUBLE THEIR WEIGHT IN TWO MOULTS

The Fisheries Minister said that while considerable biological research had been carried out for many years, economic studies of the resource were comparatively new and it was imperative that additional information be obtained to see whether or not some means of control might be instituted to bring about greater economic returns for those who depend on that fishery for their livelihood. Fishermen themselves have become more and more concerned about the problems associated with the increasing participation in the lobster fishery. For the fishermen, fishing operations become more difficult because of the crowding on the grounds, and they are also worried that the excessive fishing may deplete stocks, both in quantities available and in the size of the lobsters taken.

Canada (Contd.):

An independent survey was carried out among lobster fishermen in two important lobster fishing districts covering parts of Prince Edward Island, New Brunswick, and Nova Scotia. The survey showed that over 90 percent of the fishermen who were interviewed favored some measure of trap limitation and some means of controlling the number of persons participating in the fishery. There also have been instances where fishermen in local areas have organized plans for voluntary control of the number of traps fished.

The need for some reduction in the fishing effort for lobsters in order to achieve a more profitable operation by lobster fishermen is recognized, the Minister continued. Steps are now being taken, he said, to intensify the economic and biological studies of the fishery as they relate to effective management of the resource. The studies are to be carried out jointly by the Department of Fisheries and the Fisheries Research Board of Canada. It is also proposed to introduce in 1966, experimental limitation of the lobster fishing effort in an area in the Maritimes to see how such measures, if feasible, might be adapted in the most equitable way. Such an experiment will be undertaken only after full discussion with the fishermen concerned. (Canadian Department of Fisheries, Ottawa, October 12, 1965.)

* * * * *

CANADIAN-BRITISH JOINT FISHERIES VENTURE IN NEWFOUNDLAND:

A joint fish processing operation in St. Johns, Newfoundland, was scheduled to be set up in the fall of 1965 by a large British trawling company and a Canadian firm. The venture is to be backed by grants and loans totaling over C$1.25 million from the Canadian Federal and Provincial Governments.

A fish-salting plant for the joint firm should be completed in June 1966, and a freezing plant should be finished by the end of 1966.

Tentative plans call for the joint firm to order 6 trawlers from Great Britain at a total cost of C$1.75 million.

Total annual production in the initial stages of the venture should be about 7,000 long tons of processed fishery products. (Fishing News, London, September 3, 1965.)

(Editor's Note: The joint venture at St. Johns is the second British-Canadian fisheries operation in Newfoundland to be announced in 1965. Earlier in 1965, a large British frozen food company entered into partnership with a Newfoundland fisheries firm in order to help satisfy the growing demand for quality frozen fish in England.)

* * * * *

PROVINCE OF ONTARIO LANDINGS HIGHER IN FIRST HALF OF 1965:

Commercial fishery landings in Ontario's Great Lakes and inland waters in the first 6 months of 1965 were estimated at 18.4 million pounds with an ex-vessel value of C$2.1 million--an increase of 13.7 percent in quantity and 11.6 percent in value from the same period a year earlier. Landings were up in Lake Ontario, Lake Erie, and the North Channel but were lower for other Great Lakes areas. Landings from inland lakes during the period were about the same as in 1964. Although landings in Lake St. Clair and Lake Superior were below 1964, the value was up slightly.

Two-thirds of the Province's landings came from Lake Erie which yielded 12.2 million pounds of fish valued at $996,000. This was an increase of 19.4 percent in catch and 15 percent in value. Yellow perch landings increased slightly to 3.5 million pounds from 3.2 million pounds; smelt increased substantially to almost 5.7 million pounds from 4.7 million pounds. The greatest increase was in white bass--almost 1.6 million pounds from 769,000 pounds. Yellow pike continued to drop--137,000 pounds from 268,000 pounds.

The Northern Inland area was the second largest producer with a catch of almost 2.0 million pounds, a slight decrease from the previous year, but value increased by 27.8 percent to $303,000. The most significant increase was in sturgeon and caviar production which almost trebled to 19,000 pounds from 7,000 pounds. This was the main factor in increaseing the value of the catch for the area.

Lake Ontario showed the greatest overall increase--up 81.2 percent to 1.6 million pounds and value up 50.4 percent to $203,000. Yellow perch increased to 226,000 pounds

Canada (Contd.):

from 76,000 pounds and white perch to 391,000 pounds from 52,000 pounds. Those species accounted largely for the overall lake increase.

Lake Huron production dropped by 20 percent to 882,000 pounds valued at $227,000. Chub, the main species produced, dropped 10 percent to 420,000 pounds. Yellow perch dropped considerably to 37,000 pounds from 240,000 pounds for the same period last year. Whitefish remained about the same at 128,000 pounds. Yellow pike was the only species of consequence to show an increase to 106,000 pounds from 96,000 pounds for the same period in 1964.

Lake St. Clair production dropped 12 percent to 606,000 pounds from 689,000 pounds; the value remained almost the same as in the previous year at $189,000. Yellow perch production increased to 44,000 pounds from 16,000 pounds; white bass to 21,000 pounds from 19,000 pounds.

Lake Superior landings dropped to 490,000 pounds from 562,000 pounds while the value increased to $120,000 from $112,000. Yellow pike production increased by almost one-third to 153,000 pounds; whitefish dropped to 42,000 pounds from 47,000 pounds. (Net and Twine, Ontario Council of Commercial Fisheries, September 15, 1965.)

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SALMON FISHING CLOSES EARLY IN FRASER RIVER:

Because of the light 1965 run of chum salmon, Canada closed the Fraser River to net salmon fishing on October 4, 1965, when the International Pacific Salmon Fisheries Commission relinquished control. The action had been forecast in May 1965 when the Canadian Department of Fisheries announced that the expected 1965 run of 680,000 chum salmon (or less) to the Fraser River would be below minimum spawning requirements.

The forecast was borne out when catches of chum salmon in Johnstone Strait up to September 11, 1965, totaled less than 15,000 fish. The Johnstone Strait was closed for the season on September 14, 1965.

Catches in the Gulf of Georgia and the Fraser River on September 29 also verified the low level of chum salmon returns and indicated that the silver salmon run was probably one-half or less of that in 1964.

Following the closure of the Fraser River on October 4, test fishing indicated a buildup of silver salmon. Therefore, the Fraser was partially reopened to salmon fishing for a 24-hour period on October 12. With the completion of that period, the Canadian Minister of Fisheries announced that the river must remain closed to conserve chum salmon stocks. (Canadian Department of Fisheries, Vancouver, October 8, 1965.)

Note: See Commercial Fisheries Review, Nov. 1965 p. 43.

Denmark

JUTLAND OYSTER SEASON STARTS:

More than a million individual Danish oysters are expected to be marketed during the 1965/66 harvesting season which began in early fall 1965. The oysters are from the Limfjord beds in Jutland, and all of them will be eaten on the half-shell.

The oysters are bought in retail fish shops in "ready-to-serve" style and bring varying prices for each oyster depending on the size. Prices range downward from "A-largest" (not plentiful) at 38 U. S. cents each; "B-large" (not plentiful) 34 cents; "C" which is the size most in demand at 30 cents; and "D" the smallest, 23 cents.

"Ready to serve" means the fish retailer opens the oyster, loosens the oyster meat from the top and bottom shells, and then closes the shells before packing the oysters for the buyer. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, September 22, 1965.)

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SEAL SKINS FROM GREENLAND AUCTIONED:

The Royal Greenland Trade Department held another of its regular auctions for Greenland seal skins on September 17, 1965, in Copenhagen, Denmark. The skins offered were of better than average quality, demand was good, and prices were up.

The entire offering of 27,372 seal skins was sold for a total of about US$430,000. That

Denmark (Contd.):

included 26,198 ringed (netsider) skins which were sold at prices ranging from $2.60 to $37.70. Sales of the remaining 1,174 Greenland skins (from harp, bladdernosed, and saddle seals) were made at prices ranging from $5.20 to $55.80. There were no offerings of skins from Alaska or Canada.

Prices were estimated to be 2.5 percent above the prices for skins of comparable quality sold at the February 1965 auction in Copenhagen. Prices for skins for coats advanced, and there was a general increase in prices for skins for footwear and other industrial purposes. As usual, German buyers were the best customers. Dutch, English, and French purchases also were significant.

The next sale of Greenland seal skins by the Royal Greenland Trade Department is expected to be held in February 1966, preceded by a week of inspection of offerings. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, September 24, 1965.)

Note: See Commercial Fisheries Review, June 1965 p. 52.

Ecuador

EXPORT OPPORTUNITY FOR FISHING VESSELS AND PROCESSING EQUIPMENT: The development of the domestic tuna and groundfish industry is being emphasized by the Ecuadorean Government's National Economic Planning and Coordination Board (Junta Nacional de Planificacion y Coordinacion Economica). That agency has asked foreign suppliers to submit price quotations, specifications, and information on possible financing, payment terms, interest rates, guaranties, etc. on the following equipment which will be needed by the expanding Ecuadorean fishing industry:

Fishing Vessels: (1) Purse-seine tuna vessels with a daily freezing capacity of 20 to 30 metric tons and a storage capacity of 200 to 250 tons.

(2) Purse-seine tuna vessels with a daily freezing capacity of 50 to 60 tons and a storage capacity of 500 to 600 tons.

(3) Long-line fishing vessels for white fish (groundfish) with a capacity for 20 to 30 tons of fish. Any quotations submitted for larger vessels should include adequate refrigerated-storage capacity.

Processing and Freezing Equipment: (1) Complete land-based tuna blast-freezing plant with daily freezing capacity of 70 tons and refrigerated-storage capacity for from 1,000 to 2,000 tons, complete with supplemental brine tank, compressors, tunnels, special doors, and maintenance shops.

(2) Complete land-based white fish freezing plant with daily freezing capacity of 10 tons to minus 20° C. (minus 4.0° F.) and refrigerated-storage capacity for 100 tons to minus 18° C. (minus 0.4° F.).

(3) Complete machinery and equipment for a tuna-canning plant with capacity to handle 30 tons of fish in each 8-hour shift, packing 4-lb., 1-lb., and 1½-lb. cans. The plant will not require its own can-making machinery as cans will be acquired locally.

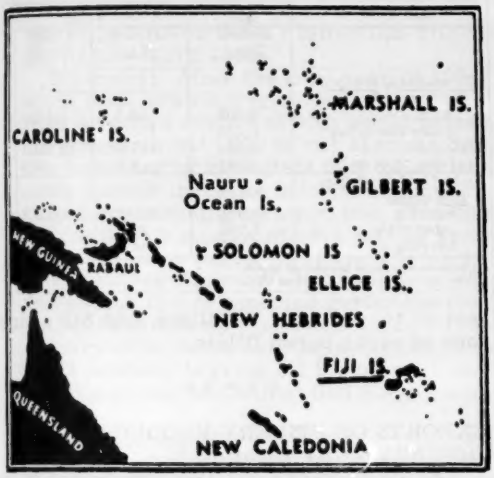
(4) Fish meal machinery and equipment (10-ton-per-day capacity) to use waste products from the canning and freezing operations as well as anchoveta and other fish taken directly for the production of fish meal.

For additional information interested United States suppliers should write directly to the Junta Nacional de Planificacion y Coordinacion Economica, Avenida 10 de Agosto 608, Quito, Ecuador. (United States Embassy, Quito, September 22, 1965.)

Fiji Islands

STATUS OF ANGLO-JAPANESE TUNA BASE: The South Pacific Fishermen's Cooperative Association composed of members from Northern Prefectures in Japan is associated with the joint Anglo-Japanese tuna fishing enterprise at Levuka, Fiji Islands. The Association plans to have a 400-ton refrigerated carrier vessel transport fish, bait, and supplies between Fiji and Japan, makmaking about 5 or 6 trips a year. A total of 16 tuna vessels, of which 15 (under 100 gross tons) are owned by Association members, operate from that base. It has been reported that the Association plans to employ Fijian

Fiji Islands (Contd.):



natives to work on its vessels. (Katsuo-Maguro Tsushin, October 4, 1965.)

Note: See Commercial Fisheries Review, Dec. 1964 p. 92, and July 1964 p. 59.

German Federal Republic

INDUSTRY RECOMMENDATIONS FOR EEC FISHERIES POLICY:

Conflicting views on a fisheries policy for the European Common Market (EEC) have been presented by various branches of the German fishing industry. The opposing recommendations of the fish processors and vessel owners were presented in a recent paper to the German Federal Government prepared by the German Federal Markets Federation (Bundesmarktverband).

In general, the processors favor a liberal EEC fisheries policy allowing free fishing, free landings, and free marketing anywhere in the EEC by member countries. The vessel owners want protection for domestic landings by German fishermen.

The German vessel owners want the Government ex-vessel price supports to be continued as long as possible. (The vessel owners suggest differences in fishery price schedules of EEC countries should be maintained for domestic sales. For export sales, price adjustments could be made.) By contrast, the processors want minimum ex-vessel prices to be standardized throughout the EEC.

Landings of foreign-caught fish (such as Danish herring) at German ports is another point of difference between the two groups. The vessel owners want the price of such foreign landings sold in Germany to be subject to some regulation. The processors disagree, claiming that artificial prices for such supplies would make it difficult for them to compete with foreign processors.

The views of the processors are related to current supply patterns for herring. At one time German vessels landed large quantities of summer herring. But the decline of the heavy shoals of herring which formerly swarmed in the North Sea has limited the German season, and the home fleet now supplies less than a quarter of the herring requirements of German processors. Offers of year-round supplies of herring by Scandinavian countries have become of greater importance and those offered by Swedish and Danish fishermen are preferred because of their prime condition.

The German processors hope to receive imports free of duty from countries in the European Free Trade Association (EFTA) as well as from the EEC. Alternatively, the processors suggest Germany could lower the rate of duty on such imports when foreign supplies are needed. (Fishing News, London, September 10, 1965.)

Note: See Commercial Fisheries Review, Nov. 1965 p. 40, and Sept. 1965 p. 60.

Greece

FREEZER-TRAWLER FISHERY TRENDS, JANUARY-JUNE 1965:

The Greek fleet of Atlantic freezer trawlers landed 12,841 metric tons of frozen fish during January-June 1965 as compared to 9,650 tons in the same period of 1964.

The value of the frozen fish landings in the first half of 1965 was estimated to be 141.2 million drachmas (US$4.7 million).

Greece (Contd.):

The Greek fleet of Atlantic freezer trawlers had increased to 29 vessels by the middle of 1965. In addition the Soviet factory trawler Krylor was acquired by a Greek firm which planned to send it to North Atlantic fishing grounds in late summer 1965. Renamed Rea, the former Soviet vessel has a capacity of 3,170 gross tons. Its freezing capacity is 38 tons per 24-hour day, and its fishroom space is 1,370 cubic meters (1,792 cubic yards). It is equipped with a cannery and fish filleting unit. It also has a reduction plant with a daily capacity of 5 tons of fish meal and 2 tons of fish oil. Main dimensions of the vessel are length overall 85 meters (279 feet), breadth 14 meters (46 feet), depth moulded 10 meters (33 feet), main engine 2,000 horsepower, speed 13 knots, and accommodations for 102 persons. Built in 1959, the Rea is the first factoryship to be acquired by a Greek fishing firm. Initially the vessel is to be operated by a mixed Soviet and Greek crew.

Credit for further development of the Greek Atlantic fishing fleet may be extended by the Greek Industrial Development Bank (ETBA). The management of ETBA and the Fisheries Directorate of the Greek Ministry of Industry were reported to be studying the terms under which development loans could be extended to Greek fishery firms operating in the Atlantic. Modernization of vessels would be a major goal of such a project. (Alieia, July 1965.)

Note: See Commercial Fisheries Review, June 1965 p. 55; March 1965 p. 74; Nov. 1964 p. 85.

Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, AUGUST 31, 1965:

As of August 31, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 3,808 metric tons, a decline of 989 tons from the stocks on hand July 31, 1965. (United States Embassy Reykjavik, September 22, 1965.)

United States imports of frozen groundfish fillets from Iceland in the year 1964 totaled 17,812 metric tons of groundfish blocks and slabs, 4,669 metric tons of cod fillets, 2,791 metric tons of haddock fillets, and 548 metric tons of ocean perch fillets.

Icelandic Export Stocks 1/ of Principal Fishery Products, August 31, 1965

Item	Qty.	Value	
	Metric Tons	Million Kr.	US$ 1,000
Groundfish, frozen:			
for export to:			
U. S.	3,808	83.8	1,946.1
other countries	6,730	116.4	2,703.2
Stockfish	4,200	117.6	2,731.1
Herring, frozen	353	2.0	46.4
Industrial products:			
fish meal:			
herring	14,051	101.2	2,350.2
other fish	4,791	32.5	754.7
herring oil	22,218	184.4	4,282.4

1/Includes only stocks intended for export.
Note: Icelandic kronur 43.06 equal US$1.00.

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EXPORTS OF FISHERY PRODUCTS, JANUARY-JULY 1965:

During January-July 1965, there was an increase in exports of salted fish (dried), salted fish fillets, stockfish, frozen herring, canned fish, herring oil, herring meal, and ocean perch meal, as compared with the same period in 1964, according to the Icelandic periodical Hagtidindi, August 1965. Exports of frozen fish fillets, cod-liver oil, salted herring, whale oil, fish meal, and whale meal showed a considerable decrease in the first 7 months of 1965.

Icelandic Fishery Exports, January-July 1965 with Comparisons

Product	Jan.-July 1965			Jan.-July 1964		
	Qty.	Value f.o.b.		Qty.	Value f.o.b.	
	Metric Tons	1,000 Kr.	US$ 1,000	Metric Tons	1,000 Kr.	US$ 1,000
Salted fish, dried	1,953	38,412	891	676	17,452	405
Salted fish, uncured	21,944	368,643	8,553	22,504	348,908	8,095
Salted fish fillets	1,424	24,255	563	900	12,808	297
Wings, salted	812	11,180	259	1,130	14,270	331
Stockfish	6,216	180,448	4,186	5,136	139,348	3,233
Herring on ice	-	-	-	19	140	3
Other fish on ice	19,238	113,223	2,627	18,247	105,363	2,444
Herring, frozen	15,803	100,271	2,326	13,823	82,184	1,907
Other frozen fish, whole	2,473	25,723	597	1,635	15,846	368
Frozen fish fillets	29,895	680,695	15,792	35,048	699,037	16,218
Shrimp and lobster, frozen	311	37,249	864	653	58,646	1,361
Roes, frozen	1,458	22,816	529	1,140	18,783	436
Canned fish	392	18,140	421	178	9,658	224
Cod-liver oil	3,504	36,431	845	7,258	64,874	1,505
Lumpfish roes, salted	799	41,848	971	409	10,248	238
Other roes for food, salted	2,016	33,268	772	2,606	38,454	892
Roes for bait, salted	825	8,717	202	2,421	20,131	467
Herring, salted	10,547	114,232	2,650	15,212	154,806	3,591
Herring oil	41,749	351,772	8,161	14,048	109,867	2,549
Ocean perch oil	-	-	-	28	188	4
Whale oil	1,805	16,302	378	2,101	18,675	433
Fish meal	15,360	101,885	2,364	23,655	147,261	3,416
Herring meal	48,265	340,314	7,895	43,198	249,900	5,798
Ocean perch meal	1,181	7,857	182	631	3,682	85
Wastes of fish, frozen	4,868	18,912	439	2,127	7,675	178
Liver meal	484	3,439	80	355	2,349	54
Lobster and shrimp meal	44	219	5	87	346	8
Whale meal	414	2,475	57	930	5,165	120
Whale meat, frozen	1,730	15,560	361	1,242	9,876	229

Note: Values converted at rate of 1 krona equals 2.32 U.S. cents.

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Iceland (Contd.):

LANDINGS, JANUARY-MAY 1965; FOREIGN TRADE AND FISHERIES TRENDS, JANUARY-JUNE 1965:

Summary: After the good year of 1964, in which Iceland's fishing industry benefitted from a record catch and high world prices, the prospects for 1965 do not seem as bright. The warnings by biologists that the Icelandic catch cannot increase indefinitely began to have more meaning by mid-1965. The catch for the first 5 months of 1965 was 12 percent below the same period in 1964. Fortunately, export prices were up: the average price for frozen fish fillets exported during the first half of 1965 was up almost 15 percent from January-June 1964; herring meal prices were up 22 percent; herring oil 8.5 percent; stockfish 5 percent; and salted fish 8.5 percent.

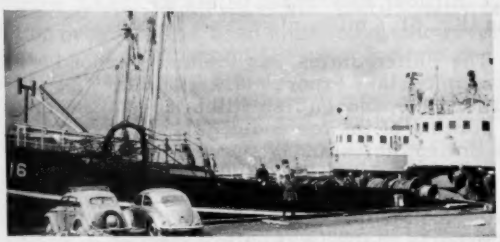

Fig. 1 - Two large Icelandic trawlers docked at Reykjavik.

Landings: The fishing industry got off to a delayed start after a 34-day labor dispute in early 1965 involving motorboat fishermen. Subsequently the entire herring fleet was idled for 6 days in June by a work stoppage. Neither dispute had a major effect on the catch. In the first 5 months of 1965, the Icelandic fisheries catch totaled 336,800 metric tons, or 12 percent less than the 382,800 tons landed in January-May 1964. A good herring catch in early 1965 prevented an even more severe decline. Herring accounted for 31 percent of the catch in January-May 1965 as compared to 21 percent in the first 5 months of 1964. (Preliminary reports show the herring catch through August 1965 running 6 percent over that in the same period of 1964.)

Processing: Paralleling the overall landings decline in January-May 1965 were a 17-percent drop in production of frozen fish (including fillets) and a 47-percent decline in output of stockfish.

Although the herring catch was up, production of salted and frozen herring in January-May 1965 was only half that in the first 5 months of 1964. Reduction for meal and oil absorbed the increased herring landings. Unfortunately, herring for reduction only yields about one-third the foreign exchange value ordinarily received from salting and freezing.

Fig. 2 - Icelandic fish filleting, freezing, and packing plant in Reykjavik. Conveyors carry fish to upper floors for processing.

Fig. 3 - Trimming and packing fish fillets in an Icelandic processing plant.

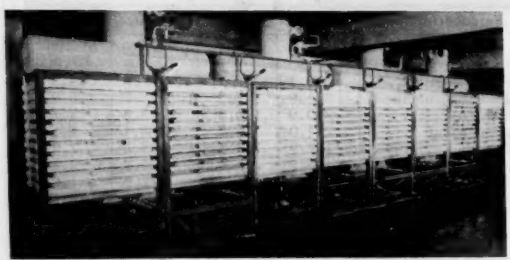

Fig. 4 - Plate freezer in an Icelandic fish-processing plant.

Labor: Negotiations were concluded in mid-1965 which resulted in a 16- to 19-percent increase in overall Icelandic labor costs (all industries). The labor shortage in the fishing industry continued unabated in the first half of 1965, with the industry partly dependent upon foreign workers (mainly Faroese) and temporary student workers. The scarcity and high costs of labor are creating a strong interest in labor-saving devices.

Iceland (Contd.):

Marketing Trends: Iceland's fisheries are an export industry. Marketing is no problem with the present strong world demand and high prices for the Icelandic fishery products. However, a decline in demand could cause marketing problems for some of the less popular products such as salted herring. In late August 1965, negotiations broke down between Iceland and the Soviet Union for the renewal of a 3-year bilateral trade agreement due to expire at the end of 1965. The Soviets reportedly were asking for more frozen fillets (for which Iceland has more than adequate Western markets) and less frozen and salted herring.

Foreign Trade: EXPORTS; Iceland's exports of fishery products in January-June 1965 were valued at Kr. 2,347.9 million (US$54.5 million) and accounted for 96 percent of total Icelandic exports during the period. Of the total exports (all products) in January-June 1965, the United Kingdom took about 22 percent; the United States 19 percent; Italy, the Soviet Union, and West Germany about 6 percent each; and Denmark, Nigeria, and Spain between 4 and 5 percent each; with the remainder going to over 20 other countries.

Value of Leading Icelandic Fishery Exports, January-June 1964-1965

Product	January-June 1965		January-June 1964	
	Million Kronur	Million US$	Million Kronur	Million US$
Frozen fish fillets . .	649.1	15.1	617.3	14.3
Salted fish, uncured	325.3	7.5	298.7	6.9
Herring oil	280.0	6.5	73.6	1.7
Herring meal . . .	241.0	5.6	178.1	4.1
Stockfish	159.9	3.7	125.2	2.9
Iced fish	105.2	2.4	96.3	2.2
Herring, frozen . .	100.1	2.3	77.8	1.8
Other products . . .	487.3	11.4	567.2	13.2
Total	2,347.9	54.5	2,034.2	47.1

Frozen fish fillets, the leading export commodity, accounted for 28 percent of the value of all fishery exports in January-June 1965. During that period, the average export price per metric ton for frozen fillets was Kr. 22,855 ($531), up 15 percent from January-June 1964. The average export price per ton for frozen fillets exported to the United States in the first half of 1965 was Kr. 25,013 ($581), an increase of 12 percent from the same period of 1964. In the first half of 1965, the frozen fillet exports were distributed as follows (comparisons for the first half of 1964 in parentheses): United States 66 percent (53 percent), United Kingdom 18 percent (10 percent), the Soviet Union 11 percent (32 percent), and other countries 5 percent (5 percent). The distribution of frozen fillet exports is an example of the declining importance to Iceland of trade with the Soviet Bloc and the growing importance of markets in the United States and the United Kingdom, as well as in other countries in the European Free Trade Association.

The United Kingdom is Iceland's primary trading partner. Total Icelandic exports to the United Kingdom increased in value from Kr. 329.0 million ($7.6 million) in the first half of 1964 to Kr. 550.2 million ($12.8 million) in January-June 1965. During the first half of 1965, the value of the main exports to Britain (comparable 1964 data in parentheses) were: herring oil Kr. 119.1 million (Kr. 5.0 million), herring meal Kr. 162.8 million (Kr. 91.7 million), and frozen fillets Kr. 113.8 million (Kr. 61.7 million).

The United States was Iceland's second most important export market. In the first half of 1965, frozen fish fillets accounted for 92 percent of the Icelandic fishery exports to the United States and were valued at Kr. 429.2 million ($10.0 million), a gain of 31 percent over the same period of 1964. The United States took 66 percent of Iceland's frozen fillet exports in the first half of 1965.

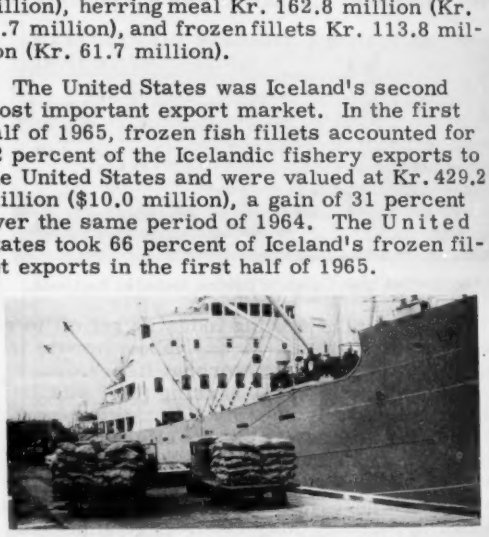

Fig. 5 - Sacked stockfish for export ready to load aboard a freighter.

Italy ranked third among Iceland's markets in the first half of 1965, largely as the result of a seasonal, but significant increase of Kr. 72.0 million ($1.7 million) in purchases of stockfish and salted fish.

The Soviet Union took only 6 percent of Iceland's exports during the first half of 1965 as compared with almost 12 percent in January-June 1964. The value of frozen fish fillet exports to the Soviet Union fell from Kr. 196.5 million in January-June 1964 to

Iceland (Contd.):

Kr. 72.9 million in the first half of 1965. Shipments of salted herring to the Soviets were also down.

Icelandic exports to West Germany dropped from Kr. 206.3 million in the first half of 1964 to Kr. 144.0 million in January-June 1965, due mainly to a decline in fish meal exports and the almost complete absence of frozen and salted herring shipments.

IMPORTS: Iceland's imports in the first half of 1965 included seven fishing vessels from East Germany. Norway supplied transportation equipment (mainly fishing vessels) valued at Kr. 210.5 million ($4.8 million).

Import Opportunities: Icelandic imports of vessels may decline in the future because much of the country's basic fleet modernization program has been completed. However, good export opportunities exist for labor-saving devices in Iceland. An example is the need in the herring fishery for pumps to move fish from net to vessel and then to transports or shore facilities. Weighing of reduction herring will be required by mid-1966, creating a considerable demand for weighing devices. Improved fishing and navigational devices of all kinds are being sought by the Icelandic fleet.

In April 1965, the Icelandic Parliament approved a bill reducing to 10 percent import tariffs on machinery used in the fishing industry, except that imported fishing equipment competitive with Icelandic domestic equipment is subject to a 15-percent duty.

Suppliers can usually reach the Icelandic market through Danish advertising channels since most foreign magazines imported by Iceland come from Denmark. (United States Embassy, Reykjavik, September 20, 1965.)

Notes: (1) In some cases, it is not clear whether summary data on Icelandic exports include products other than fishery products. However, the discrepancies resulting from such confusion should be small because fishery products account for 96 percent of Iceland's total exports.
(2) Icelandic kronur 43.06 equal US$1.00.
(3) See Commercial Fisheries Review, Oct. 1965 pp. 74-75; Sept. 1965 p. 63; Aug. 1965 p. 72.

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LANDINGS BY PRINCIPAL SPECIES, JANUARY-MAY 1965:

Species	January-May	
	1965	1964
	(Metric Tons)	
Cod	171,002	240,889
Haddock	24,973	24,714
Saithe	12,559	12,250
Ling	2,472	2,826
Wolffish (catfish)	6,052	6,858
Cusk	1,098	2,719
Ocean perch	9,221	8,630
Halibut	233	331
Herring	58,063	72,498
Capelin	49,131	8,640
Shrimp	408	89
Other	1,623	2,331
Total	336,835	382,775

Note: Except for herring which are landed round, all fish are drawn weight.

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UTILIZATION OF FISHERY LANDINGS, JANUARY-MAY 1965:

How Utilized	January-May	
	1965	1964
	(Metric Tons)	
Herring and capelin[1] for:		
Oil and meal	91,076	68,149
Freezing	12,981	9,757
Salting	3,137	3,231
Groundfish[2] for:		
Fresh on ice	18,468	17,235
Freezing and filleting	99,139	119,738
Salting	63,381	78,543
Stockfish (dried unsalted)	41,257	78,035
Canning	32	24
Oil and meal	703	1,777
Crustaceans for:		
Freezing	441	307
Canning	123	36
Home consumption	6,097	5,943
Total production	336,835	382,775

1/Whole fish.
2/Drawn fish.
Source: Icelandic periodical Hagtidindi, August 1965.

Italy

FROZEN BLUEFIN TUNA REJECTED BY CANNERY:

According to a JETRO (Japan Export Trade Promotion Organization) representative in Italy, about 461 metric tons of frozen dressed bluefin tuna delivered to a cannery in Italy have been rejected as being unsuitable for canning. The bluefin were reported to be

Italy (Contd.):

"mushy" when cooked. (Note: The article described the condition of the cooked fish as being like Japanese bean curd cake, which is soft, watery, and crumbles easily.) The fish were said to be taken off the coast of Florida.

As a result of this development, it was reported that an additional 130 tons of frozen bluefin delivered to Venice were rejected on grounds that the fish were taken from the same locality. The fish were not even unloaded from the carrier vessel and were shipped to Japan via Las Palmas. All the fish were reported rich in fat in the belly area and excellent for "sashimi" (sliced raw fish eaten by Japanese with soy sauce) but not suitable for canning. (Suisan Keizai Shimbun, September 17, 1965.)

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LANDINGS, IMPORTS, AND FISHERY TRENDS, 1964:

Italian fishermen landed 223,370 metric tons of fish and shellfish in 1964 as compared with 228,700 tons in 1963. The 1964 landings included 2,552 tons of tuna, 61,813 tons of sardine and mackerel, 107,324 tons of other fish, and 51,681 tons of shellfish.

Fig. 1 - Shooting the trawl aboard an Italian freezer trawler operating off the African coast.

The Italian fishing fleet in 1964 was composed of 29,730 vessels (194,251 gross tons) with a total value of US$105.9 million. Over 126,000 persons are employed in the fleet.

Italy imported 197,109 tons of fishery products in 1964--mostly fresh and frozen products from Denmark, Japan, Norway, France, and Germany. Over 229,000 tons of fishery products were imported in the previous year.

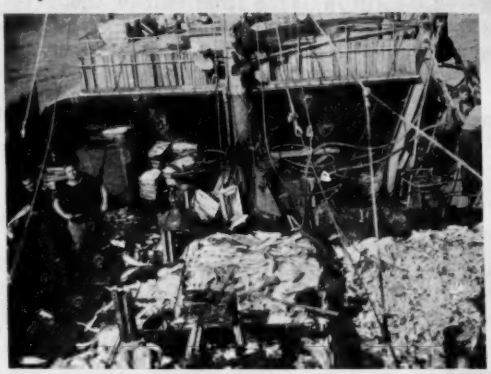

Fig. 2 - Deck of an Italian freezer trawler fishing off the African coast.

Per capita annual consumption of fishery products in Italy is about 16 pounds, mostly fresh and frozen fish. Per capita consumption of canned fish is slightly more than fish smoked, salted, or dried. Consumption of canned fish has risen significantly in recent years while consumption of other types of fishery products has remained static.

Italy exports very small quantities of fresh, frozen, and canned fish. Her principal fishery export is canned tuna to the United States. (La Pesca Italiana, August 19, 1965, and other sources.)

Note: See Commercial Fisheries Review, October 1965 p. 75.

Japan

EXPORT VALIDATIONS OF FRESH AND FROZEN TUNA AND TUNA LOINS BY COUNTRY, APRIL-AUGUST 1965:

Japan's export validations of frozen tuna and cooked frozen tuna loins to the U. S. and Canada in August 1965 were down 9.4 percent from the same month in 1964. Albacore and yellowfin accounted for 91.6 percent of that month's export approvals for those countries. Included were 1,400 short tons from Japanese transshipment bases including American Samoa.

For the 5 months April-August 1965, frozen tuna export validations for the United States and Canada were up 4.7 percent from

Japan (Contd.):

Japan's Export Validations of Fresh and Frozen Tuna and Tuna Loins by Country of Destination, April-August 1965

Item	To U. S. and Canada			To Other Countries			Total	
	July	Aug.	April-Aug.	July	Aug.	April-Aug.	Aug.	April-Aug.
	(Short Tons)			(Metric Tons)			(Metric Tons)	
Albacore, round	9,051	7,264	32,218	139	1,228	3,756	7,818	32,983
Yellowfin:								
Round	352	856	2,816	27	10	36	342	1,372
Gilled & gutted:								
20/100 lbs.	2,712	3,747	14,606	97	85	1,607	3,484	14,857
100 lbs. up	333	483	1,633	-	-	-	438	1,482
Dressed with tail	626	67	3,675	1,435	1,344	12,742	1,405	16,075
Fillets	-	-	3	-	-	4	-	6
Total	4,023	5,153	22,733	1,559	1,439	14,389	5,669	33,792
Big-eyed:								
Dressed	66	142	440	852	476	4,599	475	4,765
Other	23	27	44	1	26	378	51	419
Total	89	169	484	853	502	4,977	526	5,184
Skipjack	648	426	4,060	43	473	517	859	4,200
Bluefin:								
Dressed	-	-	-	470	529	2,468	529	2,469
Fillets	-	-	-	362	180	872	180	871
Total	-	-	-	832	709	3,340	709	3,340
Loins:								
Albacore	432	305	1,202	-	9	9	286	1,099
Yellowfin	150	240	1,025	-	19	19	237	949
Total	582	545	2,227	-	28	28	523	2,048
Grand total 1965	14,393	13,557	61,722	3,426	4,379	27,007	16,104	81,547
Grand total 1964	16,825	14,964	58,950	4,573	4,672	24,000	18,248	77,479

the same period in 1964. Included for those countries during that period were 3,513 tons from Japanese transshipment bases. (Fisheries Attache, United States Embassy, Tokyo, October 5, 1965.)

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CANNED TUNA IN BRINE STOCKS AND EXPORTS TO THE UNITED STATES AS OF SEPTEMBER 6, 1965:

Japanese export sales of canned tuna in brine to the United States during the current business year (December 1964-November 1965) totaled only 1,411,000 cases as of September 6, 1965, according to data released by the Tokyo Canned Tuna Sales Company at the Japan Tuna Packers Association's executive meeting September 6, 1965. Of those sales, 1,249,000 cases had been shipped and 162,000 cases remained to be shipped. The sales included 1,156,000 cases of whitemeat and 255,000 cases of lightmeat tuna.

Stocks of canned tuna in brine held by the Tokyo Canned Tuna Sales Company as of September 6, 1965, totaled 1,592,000 cases, of which 1,535,000 cases were whitemeat and 57,000 cases were lightmeat. The whitemeat tuna stocks included 302,000 cases classified as "B-grade." (Suisan Tsushin, September 17, 1965.)

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CANNED TUNA EXPORTERS REQUEST EXTENSION OF EXPORT AGREEMENT:

The Japan Canned Foods Exporters Association on September 22, 1965, submitted to the Japan Tuna Packers Association a request to extend to March 31, 1966, the existing Exporters Agreement, which ended November 30, 1965. The Exporters Agreement (which establishes export quotas and regulates trading activities) normally covers a one-year period, extending from December 1 to November 30 of the following year. However, the existing Agreement (1965) was not concluded until spring 1965 due to the inability of the two associations to come to terms after the expiration of the old agreement. The Exporters Association stated in its request that it hoped to see the present Agreement be made effective for one full year and, at the same time, to allow for the extension period of four months and revise upward the export quota of canned tuna in brine for sale to the United States to 2.5 million cases (from the present

Japan (Contd.):

2,210,000 cases). (Suisan Tsushin, September 28, 1965.)

Note: See Commercial Fisheries Review, November 1965 p. 63.

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TUNA FISHING AND PRICE TRENDS AS OF SEPTEMBER 1965:

Increasing numbers of Japanese tuna longline vessels in the Atlantic Ocean were returning to Japan following the end of the albacore season in late August 1965. Many of the vessels did not plan on immediately returning to the Atlantic but intended to make 1 or 2 trips out of Japan and, in the meanwhile, look the general situation over.

As of early October 1965, the main albacore fishing activity was in the Indian Ocean near Madagascar. Vessels operating in that area were averaging catches from 3-5 metric tons a day.

As a result of the declining supply this past September of Japanese-caught albacore from the Atlantic Ocean and the poor United States albacore season in the Pacific off California, the price of frozen round albacore exported to the United States from Japan proper about that time recovered to $375 a short ton c. & f. (about $330 a ton f.o.b.). The ex-vessel price of ship-frozen albacore landed in Japan proper was about 127 yen a kilogram (US$320 a short ton) for large fish and about 115 yen a kilogram ($290 a short ton) for small and medium albacore.

Most of the clipper-caught frozen yellowfin landed in Japan during September were from the Coral Sea area. Due to their excellent quality and color, those fish were diverted to the fresh fish trade and were reported to have brought the phenomenal price of 280 yen a kilogram (US$705 a short ton). (Suisan Tsushin, October 1, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 78.

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TUNA FEDERATION TO PROMOTE CANNED ALBACORE IN OIL:

The Japan National Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN) at the directors' meeting held September 28, 1965, to discuss albacore tuna price stabilization measures, agreed to launch a sales campaign to promote the consumption of canned albacore tuna in oil in Japan. This program, launched November 1, 1965, is scheduled to be continued for a period of three years. Promotional activities are to be financed with funds obtained by assessing tuna producers 80 yen per kilogram (US$2.02 a short ton) for frozen albacore and 70 yen per kilogram (US$1.75 a short ton) for iced albacore unloaded in Japanese ports. Solid pack albacore will be used in the promotional campaign. Sales target for the first year will be the equivalent of 150,000 cases (48 7-oz. cans), quantity to be progressively increased in succeeding years. (Suisancho Nippo, & Katsuo-Maguro Tsushin, September 29, 1965.)

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GOVERNMENT AND INDUSTRY HOLD FOURTH TUNA MEETING:

The Japanese Government and tuna industry leaders have been holding a series of meetings to develop measures to help the long-depressed tuna fishing industry. The fourth meeting was held in Tokyo, September 24, 1965. Whereas the first three meetings were devoted to discussions and analyses of conditions facing the industry (such as the condition of tuna resources, management and supply problems), the fourth meeting dealt with a summary review of the earlier meetings (prepared by the Fisheries Agency). A consensus of views was arrived at with respect to a general awareness of the problems facing the industry and the direction in which measures should be developed to overcome those problems.

Also at the September 24 meeting, the Japan National Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN) presented the details of its plan to establish a corporation to stabilize operation and management of the tuna fleet. According to NIKKATSUREN, the corporation would systematically carry out a tuna fleet reduction program by disposing of fishery enterprises considered hopeless of financial recovery and by assisting others in the tuna fishery in modernizing their vessels and rationalizing their management. Operating funds for the organization would be obtained from such sources as government subsidy, assessments to industry members, government and commercial loans, and flotation of loans. Some activities that the proposed organization (to be established for 20 years) would carry out are:

Japan (Contd.):

1. Fleet Reduction: Purchase licensed vessels withdrawing from the fishery and pay separation allowances to individuals affected by this reduction. Funds required for this program were estimated at:

(a) vessel purchase: 6,800 million yen (US$18.9 million) for 85 vessels each year, and 20,400 million yen ($56.7 million for 255 vessels in three years averaging 80 million yen or $222,000 per 200-ton vessel); (b) separation pay: 110.5 million yen ($307,000) for 2,210 persons each year, and 331.5 million yen ($921,000) for 6,630 persons in three years (averaging 50,000 yen or $139 per person for a vessel with a complement of 26).

2. Loans for Modernization of Vessel and Facilities: The corporation would finance up to 50 percent of the total cost of installing labor-saving devices and of facilities which serve to improve the distribution system. Loans, reportedly, would be granted interest free, repayable in 10 years with one-year deferment. Funds required for these programs were estimated at:

(a) vessel modernization: 4,500 million yen ($12.5 million) for 90 vessels each year, and 45,000 million yen ($125 million) for 900 vessels in 10 years (averaging 100 million yen or $278,000 for a 250-ton vessel); (b) facilities improvement: 200 million yen ($556,000) for two facilities each year, and 1,000 million yen ($2.8 million) for 10 facilities in five years; (c) vessel accommodation improvement: 440 million yen ($1.2 million) for 220 vessels each year, and 1,320 million yen ($3.6 million) for 660 vessels in three years.

The organization would also extend long-term loans to enterprises requiring working capital or rehabilitation funds. (Suisan Tsushin, September 25, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 80.

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TUNA FEDERATION DISCUSSES MEASURES TO STABILIZE INDUSTRY:

The Japan National Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN), September 14, 1965, held a policy committee to discuss measures for stabilizing the tuna industry. Among matters discussed at that meeting were albacore price stabilization and establishment of a corporation to carry out the tuna fleet reduction plan.

With regard to albacore price stabilization measures, the committee decided to submit this matter to the general membership on September 28 for formal action after first conducting further studies on albacore production to determine the quantity available for sale on the Japanese domestic market.

Concerning the proposed establishment of a corporation to carry out the tuna fleet reduction plan, the committee was unable to agree on how large the reduction should be, how this would affect the related industries, and how to assess the market value of "fishing rights" which the corporation would purchase from depressed vessel owners withdrawing from the tuna fishery. (Note: In Japan fishing licenses, or so-called "fishing rights," are transferable. Depending on fishing and fish market conditions, premiums paid for "fishing rights" fluctuate widely. In July this year, tuna "fishing rights" were reported selling for 130,000-140,000 yen (US$361-389) a gross vessel ton as compared to over $1,000 a vessel ton several years ago.) It was estimated that 10 billion yen (US$27.8 million), which NIKKATSUREN hopes to borrow from the Government, would be required to carry out the program.

The Committee also approved at the September 14 meeting the admission into NIKKATSUREN of the Ryukyu Distant-Water Fishery Cooperative Association as an associate member. The Ryukyuan cooperative, which manages 29 fishing vessels aggregating 6,000 gross tons, was reported seeking membership in NIKKATSUREN in order to obtain information on Japanese labor problems, stabilize operation of Ryukyuan vessel owners engaged in the Atlantic fishery, and to be eligible for participation in Japan's high-seas vessel refueling and supply program. (Suisan Tsushin, September 16, 1965.)

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ASIAN TUNA CONFERENCE BEING CONSIDERED:

The Japanese Fisheries Agency and the National Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN) are considering a plan to sponsor an "Asian Tuna

Japan (Contd.):

Conference of Scientists and Technical Personnel" in 1966. Countries to be invited to the conference are the Republic of Korea (ROK), Formosa, and the Ryukyu Islands, all of which are rapidly building up their tuna fleets and are expected to enter into widespread competition with Japan in the future. Objective of the conference is to lay the basis for "adjustments before the fact" and to promote mutual cooperation.

According to the Fisheries Agency, the ROK already has 21 tuna vessels (a total of 2,500 gross tons) in operation and is presently planning to increase her fleet by 150 vessels (a total of 30,000 tons). Further, the ROK plans to construct an additional 100 vessels with aid funds provided by Japan.

Formosa is reported to presently have in operation 250 tuna vessels (a total of 12,800 gross tons) and plans to construct 16 tuna vessels (a total of 7,000 gross tons) with funds borrowed from the World Bank.

The Ryukyu Islands has a fleet of 25 large tuna vessels (a total of 5,500 tons) which were exported to that country by Japan since 1960. With assistance from the United States, the Ryukyu Islands is reported to be planning on increasing her tuna fleet to 12,000 tons by 1971.

The Fisheries Agency is said to be concerned that the rapid advancement of the tuna fisheries in those countries will not only result in those countries entering into competition with Japan on the fishing grounds and for the same overseas market but may well lead to contributing to the decline in tuna resources. Reportedly, the Agency hopes to sponsor the tuna conference for the purpose of preventing such a development and to utilize the conference for exchanging information between scientists and discussing problems relating to technical assistance, thereby laying the groundwork for future cooperation.

It is reported that the Agency is emphasizing the following points concerning the need for holding such a conference:

1. The Japanese tuna fishery is a licensed fishery and Japan is presently restricting the expansion of that fishery. Particularly in recent years, the tuna catch hook rate has declined and there are signs that the resources are in danger. Therefore, it is necessary that every country give consideration to the condition of the resources.

2. Each country is separately supplying fish to foreign tuna markets, of which the United States market is the largest. An increase in exports may well create disorder in export prices.

3. Each country is planning on expanding its tuna fishery by using cheap labor, whereas Japan is faced with a labor shortage. It may be possible to establish a mutually profitable relationship whereby Japan could import fishing labor and provide training in fishing techniques.

The Fisheries Agency is expected to formally communicate with the three countries on holding the tuna conference as soon as it completes internal arrangements. (Nihon Suisan Shimbun, August 27, 1965.)

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JAPANESE TUNA RESEARCH VESSEL SURVEYS ATLANTIC:

The Japanese Fisheries Agency's research vessel Shoyo Maru (604 gross tons) departed Tokyo, September 25, 1965, on an extended cruise to survey the Atlantic Ocean tuna resources. The vessel is scheduled to return to Japan, March 15, 1966. (Suisancho Nippo, September 25, 1965.)

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GOVERNMENT VIEWS ON 12-MILE FISHING LIMIT:

Tentative proposals to establish a 12-mile fishing limit in certain areas of southwest Japan were discussed in an article in the Japanese periodical Nihon Keizai, September 26, 1965. According to the article, the action was planned in connection with the proposed Japanese-Korean Fisheries Agreement. However, it could have wider implications since it would be at least a partial change in long-standing Japanese policy. (Fisheries Attache, United States Embassy, Tokyo, October 1, 1965.)

In order to clarify the situation, the Japanese Fishery Agency on October 1, 1965, made an announcement (reported in Suisan Keizai Shimbun, October 4, 1965) which stated that: (1) at the present time Japan does not intend to establish an exclusive 12-mile fishing limit along the entire Japanese coast; (2) the 12-

Japan (Contd.):

mile fishing zone to be established around Tsushima (a Japanese island situated in the Korea Strait) in accordance with the proposed Japan-Republic of Korea Fisheries Agreement will not affect countries other than Korea; (3) there are moves by various countries to establish a 12-mile fishing limit, but any unilaterally established fishing limit will have no binding power upon Japan; and (4) fishing limits established by agreement between different countries apply only to the contracting powers.

To amplify the Fishery Agency announcement, the article in Suisan Keizai Shimbun, summarized Japanese views on extended fishing limits as follows:

(1) At the Second Law of the Sea Conference convened in Geneva in 1960, a proposal was made concerning 12-mile fishing limits. The Japanese position is that the proposal was not intended to codify existing international custom, but to harmonize the claims of various countries concerning the breadth of territorial waters and to achieve international agreement. Therefore, it was not an attempt to recognize any right to unilaterally establish a 12-mile fishing limit. Moreover, since the proposal was defeated, the countries that had voted for it must conform as before to international law.

(2) Since 1960, some countries have concluded bilateral or multilateral fishery agreements with the aim of establishing 12-mile fishing limits. In those cases, Japan considers that the agreements were concluded solely to enable the contracting countries to solve problems affecting their fishery interests, which the Second Law of the Sea Conference failed to resolve. Therefore, the fishing zones established under such agreements were not for the purpose of unilaterally asserting the rights of the coastal countries, but were special arrangements developed on the basis of mutual agreement. Thus, their establishment affects only the contracting countries, and generally has no effect on other countries. Any fishing zone established unilaterally will not be recognized as having binding power on Japan.

(3) With regard to the proposed Japan-Republic of Korea Fisheries Agreement, the two countries, based on the special relationship existing between them, have mutually agreed to recognize a right to establish special fishing zones. Thus, restrictions on fishing zones established by Japan are not applicable to any country other than Korea.

Note: See Commercial Fisheries Review, March 1965 p. 83, and December 1964 p. 104.

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CANNED SALMON EXPORT STOCKS, PRICES, AND MARKET TRENDS, SEPTEMBER 1965:

Following a good fishing season for both red and pink salmon, Japanese canned salmon export sales were reported moving well in September 1965. Compared with 1964, Japanese export prices in September 1965 were up for canned pink salmon, but down somewhat for red salmon (influenced by the supply situation in North America).

Since the start of the current marketing season, canned salmon export stocks consisting of 800,000 cases of red (sockeye) salmon, 650,000 cases of pink salmon, and 75,000 cases of silver salmon had been consigned to the Japan Canned Salmon Joint Sales Company as of September 18, 1965. A large part of those stocks had already been committed to buyers in the United Kingdom. Sales had also been made to France, Italy, and Australia.

As a result of a good salmon catch, Japanese canned salmon exports in 1965 are expected to exceed the 2,020,000 cases exported in 1964 and 2,130,000 cases shipped in 1963.

For September-October 1965 shipment, Japanese export price quotations per case (48 ½-lb. cans) were reported as 156 shillings (US$21.84) for red salmon (to the United Kingdom) and $12.20 for pink salmon. Compared with prices to Europe in 1964, that was a decline of about $0.56 a case for red salmon, but an increase of $0.70 a case for pink salmon. The world market was influenced by the United States and Canadian salmon catch in 1965 which yielded a good pack of red salmon but a poor pack of pink salmon. North American firms are said to be thinking of importing Japanese canned pink salmon for the first time in 3 years. (Nihon Keizai, September 20, 1965.)

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FROZEN SWORDFISH EXPORT VALIDATIONS TO THE U. S. AND CANADA, APRIL-AUGUST 1965:

Japanese export validations of frozen broadbill swordfish (mostly fillets and chunks)

Japan (Contd.):

to the United States and Canada in August 1965 totaled 569 short tons valued at US$438,551. This compared with 406 tons in August 1964 valued at $235,967.

The July 1965 export validations of that species to the United States and Canada were 312 tons valued at $224,510. In the same month of 1964 they were 200 tons valued at $112,573.

For the 5 months April-August 1965, Japan's export validations of frozen swordfish to the same countries totaled 1,694 tons valued at $1.2 million. Fillets of that species accounted for 68 percent of the total, with the remainder consisting of chunks and swordfish processed in other forms. For the same 5 months in 1964, the frozen swordfish export approvals totaled 1,153 tons valued at $641,086. (Fisheries Attache, United States Embassy, Tokyo, October 5, 1965.)

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CANNED SHRIMP EXPORTS, JULY-AUGUST 1965:

Japan's exports of canned shrimp (24 ½-lb. cans per case) during July-August 1965 were up 82 percent from the same 2 months in 1964. Shipments to the United Kingdom, the principal buyer, accounted for 67 percent of the total, or about three times more than in the same period a year earlier. The United States was the next largest buyer, with shipments down 17 percent from the same 2 months in 1964. (Fisheries Attache, United States Embassy, Tokyo, September 22, 1965.)

Japan's Exports of Canned Shrimp by Country of Destination, July-August 1965 with Comparisons

Country of Destination	1965		1964	
	July	August	July	August
	(Cases of 24 ½-Lb. Cans)			
United States	18,000	5,600	8,237	20,146
United Kingdom	79,179	19,870	16,068	16,790
Canada	9,000	5,600	7,000	6,002
France	1,300	4,000	700	850
Other	485	4,315	4,450	754
Total	107,964	39,385	36,455	44,542

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EXPORTS OF CANNED CRAB MEAT, JULY-AUGUST 1964-65:

Japanese exports of canned crab meat in the 2 months July-August 1965 were up 22.4 percent from the same period in 1964. During that period, shipments to the United States were down 37.1 percent; those to the United Kingdom increased 58 percent; and France doubled her imports of Japanese canned crab meat.

Japanese Exports of Canned Crab Meat by Country, July-August 1964-65

	United States	United Kingdom	Canada	France	Other	Total
	(No. of Cases of 48 ½-Lb. Cans)					
1965 Month:						
July	16,377	16,235	1,750	17,919	12,004	64,285
August	12,719	32,208	1,030	18,966	12,779	77,702
Total	29,096	48,443	2,780	36,885	24,783	141,987
1964 Month:						
July	17,292	18,309	1,935	8,571	6,542	52,649
August	28,936	12,348	2,487	9,705	9,917	63,393
Total	46,228	30,657	4,422	18,276	16,459	116,042

King crab accounted for 92.6 percent of all crab meat exported in July-August 1965. The remainder was from kegani, zunai, and hanasaki crab. (Fisheries Attache, United States Embassy, Tokyo, September 22, 1965.)

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EXPORTS OF FROZEN FISHERY PRODUCTS OTHER THAN TUNA, APRIL-AUGUST 1965:

Japanese exports of frozen fishery products (excluding tuna) in April-August 1965 amounted to 7,482 short tons valued at US$2,259,670. Of that total, shipments to countries in West Africa and the Union of South Africa from Japan's overseas trawl fisheries accounted for 80 percent of the quantity and 40 percent of the value.

Exports to the United States (excluding tuna) during the period totaled 908 short tons valued at $773,562. Principal items were frozen swordfish (185 tons, value $166,000), rainbow trout (230 tons, value $181,000), and shrimp (101 tons, value $170,000). (Fisheries Attache, United States Embassy, Tokyo, October 5, 1965.)

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EXPORTS OF FISHERY PRODUCTS AND OTHER MARINE PRODUCTS, 1960-64:

Japan's exports of fresh and frozen fish in 1964 were up 32.8 percent in quantity and 19.2 percent in value from the previous year. Exports increased for all items in that group except skipjack tuna and saury. Shellfish products exports increased 6.3 percent from

Japan (Contd.):

Japan's Exports of Principal Fishery and Other Marine Products, 1960-1964

Item	1964		1963		1962		1961		1960	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000
Fresh & Frozen Fish:										
Tuna, skipjack	3,549	561	4,909	847	1,485	319	1,379	236	149	39
Tuna, other	171,593	56,175	141,267	43,117	157,535	55,397	136,582	39,386	131,870	35,311
Swordfish	9,360	5,267	8,717	4,806	10,160	6,642	9,676	6,650	7,987	5,337
Sea bream	21,609	3,486	10,946	2,069	3,554	1,111	2,473	806	1,277	625
Mackerel	3,004	436	2,350	350	1,434	281	518	861	343	556
Saury	4,738	933	6,049	1,042	4,024	764	-	-	-	-
Salmon	1,395	1,472	1,154	1,403	1,552	1,639	2,346	2,272	3,641	3,517
Other	61,087	9,676	32,686	11,807	22,786	7,736	16,123	3,231	12,892	2,409
Total	276,335	78,006	208,078	65,441	20,253	73,889	169,097	53,422	158,159	47,794
Whale meat	38,752	3,611	9,068	1,144	6,928	1,139	-	-	-	-
Frog legs	755	1,183	649	1,278	603	1,383	653	778	377	636
Cured Fish:										
Cod	103	67	98	56	389	172	327	144	395	152
Other fish	544	225	583	211	1,002	333	1,405	428	1,257	356
Shark fins (dried)	1,048	1,658	1,086	1,919	1,008	1,681	1,032	1,014	1,225	1,103
Other	306	233	301	228	388	233	737	661	490	375
Total	2,001	2,183	2,068	2,414	2,787	2,419	3,501	2,247	3,367	1,986
Shellfish: 1/										
Scallops	63	544	61	431	85	531	97	539	143	589
Abalone	127	1,458	120	1,161	105	894	152	1,156	190	1,075
Oysters	2,520	603	1,175	858	2,095	550	1,886	408	2,248	431
Shrimp & lobster	1,306	1,933	1,244	1,750	1,893	2,719	1,232	1,653	1,717	2,317
Squid	6,697	1,967	6,832	1,450	2,776	417	2,387	353	2,167	283
Squid (dried)	401	209	461	306	348	381	626	561	3,123	1,103
Octopus (fresh)	859	281	1,173	406	1,764	706	-	-	-	-
Other	173	111	365	560	534	705	1,691	919	1,646	960
Total	12,146	7,106	11,431	6,922	9,600	6,902	8,071	5,589	11,234	6,758
Canned Fish & Shellfish:										
Salmon	28,138	42,522	29,799	45,339	55,244	91,231	26,621	37,094	37,512	57,367
Tuna	26,407	24,950	23,874	22,719	20,747	19,592	29,436	25,106	20,944	17,367
Tuna, skipjack	11,773	8,900	12,490	9,833	13,959	10,883	5,503	4,256	11,447	7,958
Mackerel	33,292	11,117	21,943	7,197	11,012	3,736	9,907	3,500	5,243	1,628
Saury	22,734	9,136	23,356	8,489	13,979	5,627	5,804	2,186	17,829	5,783
Sardine	641	2,778	4,675	1,744	2,831	1,169	6,082	2,450	14,439	5,475
Jack mackerel	14,388	4,847	8,972	3,072	8,400	2,917	12,811	4,283	-	-
Crab meat	4,886	12,844	4,005	10,964	3,986	10,806	4,345	11,858	4,620	11,661
Shrimp & lobster	1,946	3,353	2,033	3,504	1,274	2,378	230	475	44	105
Squid	3,604	1,131	3,824	1,264	3,198	1,108	2,751	839	2,848	797
Other shellfish	5,356	4,667	4,997	4,589	5,029	4,328	5,019	4,161	4,487	3,700
Bonito 2/	478	694	276	428	200	308	239	367	82	136
Other	15,036	9,158	11,179	8,794	9,911	7,891	4,190	2,428	11,579	4,248
Total	168,679	136,097	151,423	127,936	149,770	161,975	112,938	99,003	131,074	116,225
Other Products:										
Kelp	1,120	522	929	392	953	414	929	469	825	378
Laver 3/	768	119	125	122	41	292	39	261	23	294
Agar-agar	589	2,011	378	1,311	471	1,687	509	2,128	500	1,833
Whale oil 4/	80	16,672	117	18,211	70	8,336	101	19,247	81	15,147

1/Includes fresh, frozen, salted, and dried.
2/Boiled and dried--canned.
3/In 1,000 sheets.
4/Baleen oil (in 1,000 metric tons).
Source: Japanese Ministry of Agriculture and Forestry, Statistical and Survey Division.

the previous year and the value was up 2.7 percent.

The 1964 exports of canned fish and shellfish increased 11.4 percent in quantity and 6.4 percent in value from the previous year. Exports were up for canned tuna, mackerel and jack mackerel, and crab meat, but were lower for canned salmon, saury, and sardines. (Fisheries Attache, United States Embassy, Tokyo, June 2, 1965.)

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Japan (Contd.):

EXPORTS OF MARINE PRODUCTS, JUNE 1965:

Japan's exports of marine products in June 1965 amounted to 33,206 metric tons valued at US$15.3 million. Fresh and frozen fishery products accounted for 65.8 percent of the month's total exports in quantity and 45.1 percent in value.

Japan's Exports of Marine Products, June 1965

Product	June 1965		January-June 1964	
	Quantity	Value	Quantity	Value
	Metric Tons	US$ 1,000	Metric Tons	US$ 1,000
Fresh & frozen:				
Tuna, skipjack	684	97	3,385	469
Tuna, other	16,274	5,125	84,630	26,994
Marlin	566	381	4,809	3,248
Sea bream	2,291	345	9,929	1,512
Mackerel	143	31	1,562	320
Saury	353	86	2,963	978
Other fish	1,531	863	17,788	4,799
Total fresh & frozen	21,842	6,928	125,066	38,320
Whale meat	39	25	26,165	2,536
Frog legs	119	189	237	384
Cured:				
Cod	6	6	34	28
Boiled and dried	17	17	247	114
Shark fins	99	155	578	855
Other	10	11	126	89
Total cured	132	189	985	1,086
Shellfish, etc.:				
Scallops	3	22	12	97
Oysters	15	14	1,732	356
Shrimp	139	236	763	1,317
Squid	891	248	3,113	848
Octopus (fresh)	175	86	528	233
Other	4	30	99	285
Total shellfish, etc.	1,227	636	6,247	3,136
Canned:				
Salmon	458	697	5,764	8,472
Tuna, skipjack	594	453	4,553	3,395
Tuna, other	3,185	2,800	9,194	10,064
Mackerel	1,989	675	10,453	3,456
Saury	278	122	6,453	2,614
Sardine	64	22	571	222
Horse mackerel	1,130	345	7,998	2,659
Crabs	148	436	2,297	3,525
Shrimp	14	22	244	475
Squid	7	3	111	36
Other shellfish	526	436	1,977	1,778
Other canned products	1,292	1,031	9,314	6,782
Total canned	9,685	7,042	58,949	43,478
Other products:				
Agar agar	88	308	443	1,533
Whale oil (baleen)	-	-	71,500	15,820
Seaweed:				
Kombu	74	31	493	214
Laver	1/	11	2/1,661	108
Grand total	33,206	15,348	-	106,615

1/Not available.
2/In 1,000 sheets.
Source: Japan's Ministry of Agriculture and Forestry.

Exports of canned fish products in that month accounted for 29.2 percent of the total in quantity and 45.9 percent in value. (Fisheries Attache, United States Embassy, Tokyo, October 14, 1965.)

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BERING SEA FISHERY TRENDS:

The Japanese factoryships Hoyo Maru (14,111 gross tons), Soyo Maru (11,192 gross tons), Gyokuei Maru (10,357 gross tons), and Tenyo Maru (11,581 gross tons), as of early September 1965, had met their fish meal production targets or were expected to reach them before season's end. The firms operating the factoryships in August had concluded contracts to sell 32,500 metric tons of meal on the domestic market at 73,000 yen (US$203) a metric ton and were planning to export 2,500 tons. However, the four fleets were expected to exceed their combined production target of 35,000 tons by about 7,000 tons. The 7,000 tons are expected to be sold on the domestic market at a price higher than the earlier contracted price. (Suisan Tsushin, September 16 1965.)

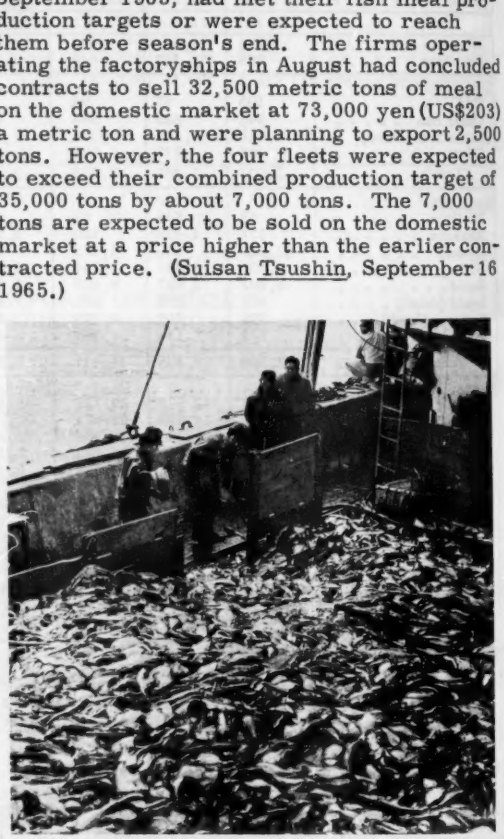

Fig. 1 - Japanese fish meal factoryship Soyo Maru. Men at left are selecting more desirable varieties to be processed for human use.

Note: The fish meal factoryships are expected to show profits ranging from $275,000 upwards to $550,000 due to excellent produc-

Japan (Contd.):

tion and high fish meal and oil prices, up $33 a ton and $55 a ton, respectively, from last year's prices. It is noteworthy that in previous years Japanese fish meal factoryship operators have not generally fared well. The firm which pioneered the development of the Bering Sea fish meal fishery in the late 1950's pulled her two fleets out of that fishery for two years (1962-63) due to the tremendous losses it suffered, only to re-enter the fishery with one fleet in 1964. Where effort was formerly concentrated on harvesting flatfish, primary effort now is in catching Alaska pollock.

Of the 14 Japanese factoryship fleets licensed to operate in 1965 in the central and eastern Bering Sea, 6 had ended operations and 8 were still on the fishing grounds as of early September 1965. They are the Soyo Maru (11,192 gross tons); Tenyo Maru (11,581 gross tons); Einin Maru (7,482 gross tons); Gyokuei Maru (10,357 gross tons); Shikishima Maru (10,144 gross tons); Aso Maru (3,500 gross tons); Chichibu Maru (7,420 gross tons); and Hoyo Maru (14,111 gross tons).

Fig. 2 - Japanese shrimp factoryship Einin Maru.

As of September 11, the 14 fleets had landed a total of over 342,000 metric tons of fish, consisting of 215,000 tons of Alaska pollock, 37,200 tons of rockfish, 33,400 tons of herring, 25,300 tons of flatfish, 17,500 tons of cod, 9,000 tons of shrimp, 3,400 tons of sablefish (black cod), and 1,800 tons of halibut. This is equal to about 85 percent of their combined production target. (Suisan Keizai Shimbun, September 17, 1965.)

The Japanese shrimp factoryship Einin Maru (7,482 gross tons) had produced as of September 14, 1965, the equivalent of 131,000 cases (48 cans) of shrimp packed in Japanese No. 2 tuna cans (solid content 4.48-ozs.), in addition to 1,000 metric tons of headless and heads-on frozen shrimp. The factoryship was expected to meet only about 80 percent of her production target of 180,000 cases when she ended operations in late September. (Suisan Tsushin, September 16, 1965.)

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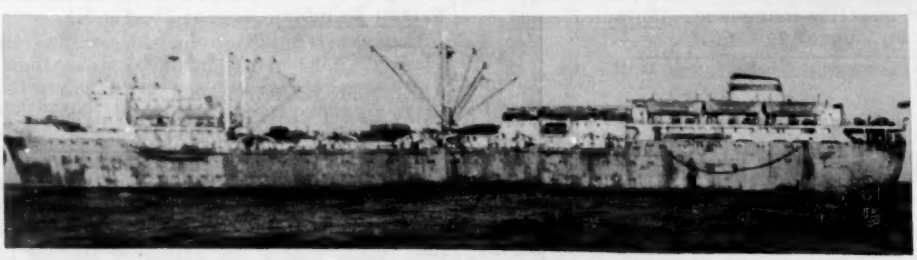
SAURY FISHERY TRENDS, MID-OCTOBER 1965:

Saury fishing was off to a poor start off northern Japan on the Pacific side of Honshu, with strong fishing competition between Japanese, Soviet, and South Korean vessels, according to the October 14, 1965, issue of the Japanese periodical Mainichi Shimbun. Following are excerpts from that article in Mainichi Shimbun:

Six or seven years ago, the U.S.S.R. began to fish for saury off Japan along the Pacific Coast of Honshu, and in the fall of 1965, the Soviets had seven motherships supporting their saury fleets off Honshu. In addition, vessels from South Korea were also fishing for saury in that area with Sanriku as a base. About 500 Japanese saury fishing vessels were working in the same area. However, the saury catch as of mid-October was very light. As a result, ex-vessel prices were up sharply. For example, saury landings at Onahama (Fukushima Prefecture) up to October 10, 1965, were 1,700 metric tons with an ex-vessel value of 121 million yen (US$336,100), as compared with 4,867 tons valued at 149



Soviet mothership engaged in saury fishery off Japan.

Japan (Contd.):

million yen ($413,800) for the same period of 1964.

The Korean saury fleet off Japan consisted of the fishing vessels Torin-Go No. 55 and No. 56 with one carrier vessel.

An observer with the Korean fleet reported sighting seven Soviet saury fleets, the mothership of which were in the 7,000- to 10,000-ton class. One Soviet mothership was reported to have five to ten 300-ton catcher boats with it.

Note: See Commercial Fisheries Review, March 1965 p. 81; and Feb. 1965 pp. 64 and 71.

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GOVERNMENT'S POLICY ON IMPORTS OF ALASKA POLLOCK FROM U.S.S.R. QUESTIONED:

On August 6, 1965, the Japanese Diet's Budget Committee held a hearing on the plans of certain large fishing companies and trading firms to purchase from Soviet trawlers operating in the Okhotsk Sea Alaska pollock for processing into fish meal. The Fisheries Agency director was questioned by the committee concerning the Agency's position with regard to this development. The director stated that the Agency had received applications to import a total of 180,000 metric tons of fish from the Soviet Union and had arrived at an adjustment figure of 50,000 tons, but by no means was the 50,000 tons a firm figure and that it may be adjusted after further deliberation.

Fishermen and processors from northern Japan are strongly opposed to the importation plan and have mustered the support of their Diet representatives in an attempt to kill it. In spring 1965 (under a three-year contract beginning in 1965) one Japanese firm had purchased 36,300 metric tons of Alaska pollock for processing into meal. Those in opposition to the importation plan do not want to have the import quantity increased. (Suisan Keizai Shimbun, August 7, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 83.

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ALASKA POLLOCK CATCH IN SEA OF OKHOTSK AND LIVER-OIL PRODUCTION, APRIL-JUNE 1965:

The Japanese catch of Alaska pollock in the Sea of Okhotsk (landed at Hokkaido ports) in April-June 1965 amounted to 61,800 metric tons from which 1,110 tons of liver oil was produced. During the same 3-month period in 1964 the catch was 94,000 tons and the liver-oil yield was 1,555 tons. (Fisheries Attache, United States Embassy, Tokyo, August 3, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 83.

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SALMON ROE IMPORTED FROM UNITED STATES:

A survey of the Japanese firms importing salmon roe from the United States and Canada shows that as of early September 1965 only about 810 short tons of roe had been purchased. That was less than half the intended purchase target of 1,800 tons. Supplies of salmon roe in the United States were light as a result of the small pink salmon run this year.

Demand for processed salmon roe continues strong in Japan. One firm was reported offering Alaskan salmon roe at the following prices: chum salmon roe 1,500-1,900 yen a kilogram (US$1.91-2.40 a lb.); red salmon roe 1,300-1,700 yen a kilogram ($1.64-2.15 a lb.); and pink salmon roe 1,300-1,750 yen a kilogram ($1.64-2.21 a lb.). (Suisan Tsushin, September 15, 1965.)

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FISHING FIRM PLANS TO EXPLORE ANTARCTIC WATERS:

A large Japanese fishing company has submitted an application to the Fisheries Agency to explore Antarctic waters to determine the feasibility of establishing a new commercial fishery. The company plans to dispatch in October 1965 the 700-ton vessel Chiyoda Maru No. 5 to the waters south of 40° S. latitude to explore areas other than existing trawling grounds. The vessel, which will carry about 20 fishery specialists and will test different types of gear, is scheduled to be at sea for about seven months. The Fisheries Agency is expected to approve the application. (Nihon Suisan Shimbun, August 25, 1965.)

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ASKS FOR EXTENSION OF PRIVATE FISHERIES AGREEMENT WITH COMMUNIST CHINA:

Extension of the private fisheries agreement between Japan and Communist China was recommended in the latter part of 1965 by the Japan-China Fisheries Council (an organization representing the Japanese fishing industry). The Council's recommendation was sent

Japan (Contd.):

to the Communist Chinese Fisheries Association. The Chinese had previously ignored requests for renegotiation of the agreement, which is scheduled to expire December 23, 1965.

The areas covered by the agreement are the Yellow Sea and the East China Sea north of 27° N. latitude and east of a line extending approximately 50 miles off the Chinese mainland. In those areas, the agreement provides, among other things, for six fishing zones where a limited number of fishing vessels from both countries may fish, and emergency ports of call for distressed fishing vessels of both countries.

The Japanese are dissatisfied with some points of the agreement, but believe it would be difficult to revise at present. Therefore, simple extension was asked by the Japanese in order to protect their fishing vessels in the areas concerned. Japan is reported to have 760 dragnet vessels and 20 trawlers operating in the areas covered by the agreement. (Nihon Keizai, October 8, 1965.)

Note: See Commercial Fisheries Review, January 1964 p. 41.

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JAPANESE FISHING FIRMS TO CUT BACK EQUIPMENT INVESTMENTS IN 1966:

Japan's four major fishing firms are planning to reduce their equipment investments as much as possible for 1966 and, at the same time, shift investment emphasis from expansion to modernization. This move is needed because there are few fishing grounds left for Japan to develop except for pelagic trawling, thus largely reducing the need for new vessels. Also, the firms are compelled to improve their financial position, which has greatly deteriorated in recent years because of their heavy borrowings for expansion purposes.

The firms have already reduced drastically their equipment investments in 1965, from the annual average for the five-year period from 1960-1964--one down 70 percent, one 60 percent, and the third 20 percent.

One of the four firms has decided to keep its equipment investment outlays within the limit of depreciations for the next 3-5 years and reduce the total equipment investment expenditure for 1966 to 2,600 million yen (US$7.2 million) from 4,600 million yen (US$12.8 million) for 1965. A second firm, which already has whittled down their 1965 capital expenditure to 2,500 million yen ($6.9 million), is planning to reduce further the outlay for 1966. The third firm likewise is reducing such expenditure to about 1,000 million yen ($2.8 million) for 1966 from their 1965, 2,000 million yen ($5.6 million). The fourth, which limited its equipment investments to only 1,200 million yen ($3.3 million) in 1965, is cutting such expenditure to about 700 million yen ($1.9 million) for 1966. (The Japan Economic Journal, October 5, 1965.)

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FISHING VESSELS LICENSED FOR CONSTRUCTION, APRIL-JUNE 1965:

In the 3 months, April-June 1965, the Japanese Fisheries Agency approved the construction of 170 fishing vessels--86 steel vessels (totaling 12,664 gross tons) and 84 wooden vessels (totaling 3,041 gross tons) for a combined total of 15,705 gross tons.

In the same 3 months of 1964, the Agency approved the construction of 100 vessels (68 steel vessels totaling 27,257 gross tons and 32 wooden vessels totaling 1,091 gross tons) for a total of 28,348 gross tons. More steel vessels for the tuna and bonito fishery were licensed for construction in April-June 1964 than in the same period of 1965. Also, approval for the construction of 3 steel fish carriers (totaling 12,920 gross tons) accounted for the larger gross tonnage of a year earlier. (Fisheries Attache, United States Embassy, Tokyo, August 11, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 81.

* * * * *

NEW PORTABLE TUNA CATCHER VESSELS:

In early September 1965, a Japanese shipyard delivered to a Japanese fishing company

New portable tuna catcher vessel Eiryu Maru No. 1.

Japan (Contd.):

three new portable tuna catcher vessels (the Eiryu Maru No. 1, No. 2, and No. 3). Specifications of the new vessels are length between perpendiculars 15.5 meters (50.8 feet), width 3.7 meters (12.1 feet), depth 1.45 meters (4.8 feet), and gross tons 19.7. Each vessel is equipped with a 90-horsepower Diesel engine giving a speed of about 9 knots. The Japanese builder has launched 28 similar vessels since 1960. (Fisheries Attache, United States Embassy, Tokyo, September 20, 1965.)

* * * * *

IMPROVED METHOD FOR SETTING AND RETRIEVING LONG-LINE GEAR DEVELOPED:

The Japanese Government has been involved for some time in intensive studies to develop means of improving fishing efficiency to assist the depressed tuna fishing industry. The Government's Tokai Regional Fisheries Research Laboratory has succeeded in developing a new and improved method for setting and retrieving tuna long-line gear. The new method (which basically employs a reel, conveyor, line hauler, and side roller) was expected to be ready for commercial application after final trial tests in fall 1965.

Under the new method, the entire long-lining operation, setting and retrieving, is mechanized. In the setting operation, the main line (pulled off a reel by a pulley) mechanically picks up the branch lines and float lines by means of a special hook attachment as it is paid out from the stern. Gear-setting speed can be automatically adjusted to the speed of the vessel and current flow. Specially designed "D" rings are used to prevent kinking and tangling of lines. To facilitate reeling, a braided rope is used for the main line instead of the usual three-strand rope.

In retrieving the gear, the long-line is hauled in from the starboard side of the vessel, over a specially designed side roller, by means of a line hauler. The main and branch lines are unhooked and separated as they come over the roller, and the branch lines are wound with a spooling device. A conveyor installed on the port side transports the branch lines and float lines to the stern for the next setting. In removing tuna from the branch line, a winch-operated rope is used to haul the fish into a tube to prevent struggling.

Cost of installing the reel and other mechanical devices is expected to run between 2-2.5 million yen (US$5,556-6,945) per vessel. (Suisan Keizai Shimbun, September 22, 1965.)

日本

Kenya

CANNERY FOR SHRIMP AND SPINY LOBSTER PLANNED IN COASTAL AREA:

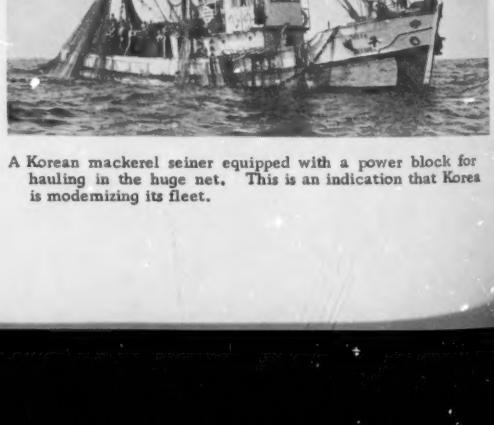
The Kenya Government has been consulting with a British firm on the establishment of a fish-canning industry at Lamu (located on the coast), according to a report from a bank in Nairobi.

Hopes are that a cannery will be built there to pack spiny lobster and shrimp caught in the Indian Ocean. (Fishing News, September 3, 1965.)

Republic of Korea

LARGE-SCALE EXPANSION OF FISHING INDUSTRY PLANNED:

Upon the ratification in October 1965 of the normalization agreement (concluded in June between the Governments of Japan and South Korea), the Republic of Korea (ROK) will undertake a massive buildup of her fishing industry with funds provided by Japan. A total of US$190 million ($100 million from a total of $300 million in reparations owed to the ROK, plus $90 million from the fisheries aid fund which Japan agreed to provide to the



A Korean mackerel seiner equipped with a power block for hauling in the huge net. This is an indication that Korea is modernizing its fleet.

Republic of Korea (Contd.):

ROK under the normalization agreement) is expected to be made available over an eight-year period for the construction of fishing vessels, processing and other industry-connected facilities, and related programs. The Japanese Fisheries Agency is engaged in working out guidelines so that aid can be granted to the ROK.

According to available reports, the ROK plans to spend the $90 million of fisheries aid fund within three years in the following manner:

Period	Item	Cost
		US$
First Year:	Import 253 fishing vessels	37,784,000
	Construct 122 fishing vessels1/	8,670,000
	Construct processing facilities	825,000
	Other related enterprises	11,000,000
	Total	58,279,000
Second Year:	Import 5 fishing vessels	6,800,000
	Construct 118 fishing vessels 1/	10,845,000
	Construct processing facilities	1,050,000
	Other related enterprises	350,000
	Total	19,045,000
Third Year:	Import 1 fishing vessel	2,000,000
	Construct 73 fishing vessels 1/	8,874,000
	Construct processing facilities	1,475,000
	Total	12,349,000
	Grand Total	89,673,000

1/Parts to be furnished by Japan for assembly in Korea.

Imports in the first year are to include 76 trawlers of 100 tons each, 126 surrounding-net vessels (broken down into 21 "parent" vessels of 100 tons each and 63 "light" vessels, of 40 tons, and 42 carrier vessels of 150 tons), 45 tuna long-liners of 250 tons each, 5 refrigerated carrier vessels of 500 tons each, and 1 stern trawler of 1,500 tons. During the second year, the ROK plans to import four 1,500-ton and one 3,460-ton stern trawlers, and in the third year another 3,000-ton vessel.

Types and sizes of vessels which the ROK plans to construct during the three-year period include 124 large trawlers of 100 to 120 tons each, 77 medium-type and shrimp trawlers of 50 to 60 tons, 45 tuna long-liners of 250 tons, 10 tuna vessels of 70 tons, 42 carrier vessels (for the surrounding-net fleet) of 150 tons, 10 whaling vessels of 80 tons, and 5 refrigerated carrier vessels of 500 tons--a total of 313 vessels.

In addition, also within the first three years, the ROK reportedly plans to spend from the reparation payment of $100 million allotted for fisheries $5,327,000 for the importation of 89 fishing vessels and $14,951,000 for other fisheries facilities and programs. (Suisan Keizai Shimbun, September 20, 1965, Suisan-cho Nippo, September 30, 1965, and other sources.)

Mexico

AGREEMENT REACHED IN WEST COAST SHRIMP VESSEL TIE-UP:

The Mexican West Coast shrimp industry is under way again following agreement early in October 1965 between vessel owners and fishermen's cooperatives concerning shares and method of payment. Negotiations to renew contracts commenced in June 1965 but neither group was willing to compromise until after two weeks had been lost of the 1965/66 season. All privately-owned vessels remained in port when the season opened on September 15 because of the deadlock in contract negotiations, and only those owned by the cooperatives put out to sea.

Part of the large number of shrimp vessels operating out of the Port of Mazatlan.

During the lengthy negotiations, both the vessel owners and the cooperatives, which provide the crews, claimed that they needed a larger share of the proceeds than was specified in the expired contract in order to break even. The National Chamber of the Fishing Industry, representing the vessel owners, prepared an economic study of the shrimp fishery which when presented became the basis of discussions. Various proposals were made, ranging all the way from virtually outright nationalization of the industry to bypassing the cooperatives completely.

Mexico (Contd.):

Meanwhile the few cooperative vessels that started fishing out of Mazatlan had spotty fishing and those at Guaymas did fairly well. A hurricane in September sank over 20 unmanned vessels that were moored at the dock in Mazatlan.

The Government played a big role in bringing the two groups together. They agreed in writing to a seven-year contract, the details of which were being worked out. Previous contracts have been for two years, so the longer term will encourage greater stability in the industry.

Pending further contract details the fleet went to sea. The principal feature of the agreement is in the sharing of costs and proceeds. Instead of 45 percent of the gross, the cooperatives will receive 54 percent. This amount will be paid in the form of shrimp as soon as the shrimp are delivered and sorted for size, rather than a later payment in money. This removes a cause of friction, and both owners and cooperatives will ship their own shrimp as exporters. Although receiving more shares, the cooperatives will pay more of the operational costs. In addition to the traditional cost of groceries for the crew, the cooperatives will now pay for diesel oil, gasoline, and lubricants. The vessel owners, with their share reduced to 46 pecent, will continue to pay only for the fishing gear and its maintenance and vessel maintenance.

In early October, contracts were settled with Mexican shrimp fishermen to resume fishing in the open waters of Baja California. Fishing was reported to be exceptionally good and much better than at the same time a year earlier.

Shrimp fishing by canoes inside the coastal lagoons started on September 1 and was said to be also much better than a year earlier. (Regional Fisheries Attache, United States Embassy, Mexico, September 14 and October 6, 1965.)

Note: See Commercial Fisheries Review, November 1964 p. 98.

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UNITED NATIONS SPECIAL FUND PROJECTS TO AID FISHERIES DEVELOPMENT:

Mexican fisheries may receive substantial aid from the United Nations Special Fund.

A 2-year survey of all types of resources (including fisheries) in the Mexican State of Oaxaca is being carried out jointly by the United Nations Special Fund and the Mexican Government. Approved in June 1965 by the Special Fund, the project is designed to gather data that can be used immediately to plan development projects. It should also train Mexican personnel in resource analysis techniques. The survey is in some respects a pilot operation that could lead to similar programs in other Mexican states. The Special Fund is contributing US$692,500 for the Oaxaca survey and the Mexican Government is contributing $75,000. The Food and Agriculture Organization is serving as the excuting agency.

The resources survey should aid a separate Mexican fish retailing project begun in May 1964 by the Oaxaca State Government. The State project has rapidly increased fish consumption in Oaxaca by making fresh and frozen fish available at low prices. (The heart of the project is a retail store, freezer, and cold storage in the capital city of Oaxaca.) The object of the retailing project is to develop the State's fisheries and relieve the serious shortage of animal protein in the diet of the people of Oaxaca.

In the fall of 1965, another Mexican proposal for a 4-year fishery research project was awaiting consideration by the Special Fund. For that project. Mexico offered $3,204,406 and requested $1,801,700 from the Special Fund. The money would be used to widen the activities of the Mexican National Institute for Bio-Fisheries Research. The funds would expand the expert staff of the Institute and provide it with training fellowships; equipment including exploratory and research vessels would also be provided. The project would be concerned not only with basic research on Mexico's fishery resources, but also with fishing methods and marketing. It was hoped that the project, if approved, would resolve technical problems related to conservation, fishing methods, processing, transport, and commercial distribution. Systematic research into domestic and export markets would be carried out. The marketing research would involve data collection and cost studies.

If approved, the Mexican research program would probably be coordinated with Special Fund regional fisheries programs in Central America and the Caribbean. While awaiting

Mexico (Contd.):

approval, the Mexican Bureau of Fisheries was proceeding with plans to mesh its work with that of the proposed project. (United States Embassy, Mexico, D.F., March 30 and August 10, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 84, May 1965 p. 55, Jan. 1965 p. 60.

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YUCATAN'S FISHING INDUSTRY EXPANDS:

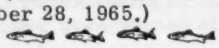
The fishing industry in Mexico's State of Yucatan has expanded rapidly in the past few years with total landings for 1964 estimated at 8,000 metric tons. This was 43 percent more than the 5,600 tons landed in 1961, or an increase each year of about 14 percent. In 1956, total landings amounted to 2,500 tons.

The main fishing area is centered in the district of Progreso, and to a lesser extent in Dzilam, Telchac, and Celestum. The most important commercial species is jewfish (warsaw) or "mero" which accounted for about 80 percent of the total landings in 1961, most of it for export to the United States.

Yucatan has a coastline extending for 275 miles in the Bay of Campeche (Gulf of Mexico), with a continental platform of approximately 3,500 square miles. Shrimp fishing is difficult because of the rocky bottom, but excellent conditions exist for hook-and-line fishing for jewfish at relatively shallow depths and of red snapper at greater depths.

The Yucatan fishing industry is reported to be well organized and there are good prospects for even faster growth in the future. A project is planned for the construction of a fishing port at Cienega de Progreso which would greatly promote the development of the fishing industry of Yucatan. The project was reported to have been submitted to the National Advisory Commission on Fisheries, but had not yet been approved. The construction of that port is considered essential for the development of the fishing industry in Yucatan since there is no safe harbor for fishing craft at present in the state.

It is also considered that there are possibilities for expanded production by increasing the catch of species other than jewfish, such as Spanish mackerel (sierra), shark, turtles, and octopus. (United States Embassy, Mexico, D.F., September 28, 1965.)



North Viet-Nam

FISHING FLEET EXPANDS WITH SOVIET AID:

In May 1965, a North Vietnamese crew arrived in the Black Sea port of Sevastopol to take delivery of the first of three freezer trawlers being built for North Viet-Nam by a Soviet shipyard. The other two vessels were to be delivered before the end of 1965. The trawlers, each of which is to be manned by a crew of 30, should be able to stay at sea over 50 days. Each vessel has a daily freezing capacity of 6-7 metric tons of fish and a hold capacity of 200 metric tons.

The three freezer trawlers will be a significant addition to the small but growing North Vietnamese fishing fleet. Before 1954, North Vietnamese fishermen operated their sampans, junks, bamboo rafts, and other primitive craft close to land. Most of the fishing craft were small (less than 5 gross tons) and lacked engines. However, about 10 years ago North Viet-Nam began receiving larger motorized boats as aid from other countries. East Germany, Communist China, and the Soviet Union were the major suppliers of modern fishing vessels. Japan supplied four motorized fishing vessels in 1958.

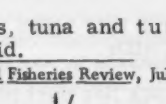
In 1956, the Soviet Union was instrumental in sponsoring the West Pacific Fisheries Commission, which was organized to conduct fishery research and to exchange technical information among the five Asian Communist Nations (North Viet-Nam, Communist China, North Korea, Mongolia, and the Soviet Union). The Commission meets yearly, alternating its meetings among the capitals of the signatory powers. The 9th session was held in Hanoi on November 10, 1964. It is believed that it was at that meeting that North Viet-Nam asked the Soviet Union to implement the provisions of a technical cooperation agreement to provide extensive fisheries aid to North Viet-Nam. While full details of Soviet North Viet-Nam relations in fisheries are not known, it appears that the Soviet Union promised North Viet-Nam some modern fishing vessels.

In 1960-62, the Soviet Union and North Viet-Nam conducted joint exploratory and scientific research in the Gulf of Tonkin. The purpose of that research program was to assess fish and shellfish resources in the Gulf and to find ways to help North Viet-Nam use them more extensively and more efficiently. The waters of Viet-Nam are reported to be rich in sar-

North Viet-Nam (Contd.):

dines, anchovies, tuna and tunalike fish, sharks, and squid.

Note: See Commercial Fisheries Review, July 1962 p. 104.



Norway

EXPORTS OF CANNED FISHERY PRODUCTS, JANUARY-MARCH 1964-1965:

Norwegian exports of canned fishery products in the first quarter of 1965 were up 23 percent in quantity and 20 percent in value from those in the same period of 1964. The increase was due mainly to larger shipments of smoked small sild in oil. Exports were also up for most other Norwegian canned fishery products, with the exception of smoked brisling in tomato, unsmoked small sild in oil, soft herring roe, and shellfish.

In January-March 1965, the United States continued to be the leading buyer of Norwegian canned fishery products, taking 45 percent of total shipments, followed by the United Kingdom with 13 percent. (Norwegian Canners Export Journal, July 1965.)

Note: See Commercial Fisheries Review, Aug. 1965 p. 90, and Oct. 1964 p. 74.

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Table 1 - Norwegian Exports of Canned Fishery Products by Type, January-March 1964-1965

Product	January-March 1965			January-March 1964		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Kroner	US$1,000	Metric Tons	1,000 Kroner	US$1,000
Smoked brisling in oil	1,675	11,921	1,665	1,327	8,934	1,248
Smoked brisling in tomato	135	738	103	162	912	127
Smoked small sild in oil	3,114	12,968	1,811	2,259	9,841	1,374
Smoked small sild in tomato	524	1,869	261	374	1,342	187
Unsmoked small sild in oil	61	213	30	172	568	79
Small sild packed otherwise	219	834	116	97	364	51
Kippered herring	927	4,188	585	754	3,380	472
Mackerel	175	869	121	159	765	107
Roe, unclassified	275	1,174	164	163	626	87
Soft herring roe	57	349	49	134	679	95
Fish balls	121	327	46	118	305	43
Other canned fish	22	159	22	21	160	22
Shellfish	310	2,815	393	411	4,151	580
Total	7,615	38,424	5,366	6,151	32,027	4,472

Table 2 - Norwegian Exports of Canned Fishery Produts1/ by Country of Destination, January-March 1964-1965

Country of Destination	January-March 1965			January-March 1964		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Kroner	US$1,000	Metric Tons	1,000 Kroner	US$1,000
Finland	125	575	80	54	292	41
Sweden	199	914	128	85	414	58
Belgium-Luxembourg	162	789	110	157	754	105
Ireland	87	352	49	49	207	29
France	57	261	37	67	265	37
Netherlands	47	188	26	46	157	22
United Kingdom	983	4,579	640	1,202	5,823	813
West Germany	268	973	136	181	710	99
Czechoslovakia	58	252	35	97	313	44
East Germany	621	2,102	294	2/	2/	2/
South Africa Republic	510	2,000	279	466	1,853	259
Iraq	8	30	4	40	150	21
Canada	254	1,658	231	149	899	125
United States	3,411	19,192	2,680	2,544	13,856	1,935
Australia	423	1,707	238	460	1,845	258
New Zealand	59	251	35	107	465	65
Other countries	259	1,029	144	237	896	125
Total3/	7,531	36,852	5,146	5,941	28,899	4,036

1/Does not include exports of canned shellfish.
2/Data not available.
3/Totals are slightly different than the combined exports of canned fish (excluding shellfish) shown in table 1.
Note: Norwegian Kroner 7.16 equal US$1.00.

Norway (Contd.):

CANNED FISH EXPORTS, JANUARY 1-JUNE 26,1965:

Preliminary data show that Norway's total exports of canned fishery products during January 1-June 26, 1965, were down about 5 percent from those in the same period of 1964. Exports were somewhat lower in 1965 for smoked small sild, soft herring roe, and shellfish, but there was a small increase in shipments of brisling and kippered herring.

Norwegian Exports of Principal Canned Fishery Products, January 1-June 26, 1965, with Comparisons

Product	1965	1964
	Jan. 1-June 26	Jan. 1-June 27
	(Metric Tons)	
Brisling	2,966	2,845
Smoked small sild	6,182	6,365
Kippered herring	1,671	1,516
Soft herring roe	566	957
Sild delicatessen	288	220
Shellfish	656	846
Other fishery products	1,304	1,558
Total	13,633	14,307

In 1965, the Norwegian canning season opened on May 1 for small sild and on May 19 for brisling. By July 24, 1965, the pack was 232,100 standard cases of small sild and 240,762 standard cases of brisling. At the same date in 1964, the pack was 226,058 cases of small sild and 278,485 standard cases of brisling. The decline in the brisling pack was due to a disappointingly small catch of brisling. (Norwegian Canners Export Journal, August 1965.)

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NORTH SEA HERRING FISHERY CONTINUES GOOD IN OCTOBER 1965:

In the first half of October 1965, the Norwegian catch of herring in the North Sea area totaled 1,125,000 hectoliters (104,625 metric tons), or 3 times as much as was taken in all of October 1964. The fat content of the herring caught in October 1965 was still at the high level of 20-22 percent. (The Export Council of Norway, Oslo, October 1965.)

Panama

FISHERIES DEVELOPMENT OUTLOOK:

Shrimp is Panama's major fishery--shrimp exports in 1964 were valued at US$7.3 million. In the past, the Government of Panama has tried to stimulate the use of other fishery resources that appear abundant off Panama, but with only moderate success. Now, however, the outlook is improving.

Fig. 1 - One of the more modern trawlers docked at a shrimp-plant unloading dock in Panama City.

Fig. 2 - Three shrimp plants are located in this area of Panama City. Trawlers fish shrimp for the plants.

New investment in Panama's fishing industry is being actively encouraged by the privately-owned development bank, Desarrollo Industrial, S.A., and the Government-controlled Banco Nacional. Financial assistance to help build a new boatyard is being sought from those banks by the Panamanian owners of a new $2 million fish meal plant being built near Panama City. They are interested in a boatyard that can build 100-ton vessels to supply their reduction plant with anchoveta and thread herring.

Panamanian fisheries may also be aided by the Central American Fishery Development Project sponsored by the United Nations Special Fund. The impact of the United Nations project will partly depend upon the success of the Panamanian Government in stimulating

Panama (Contd.):

Fig. 3 - The most modern shrimp plant in Panama City has two sorters--one for large and the other for titi shrimp.

new investment and activity in the country's fisheries. (United States Embassy, Panama City, May 19, and October 8, 1965.)

Persian Gulf

BRITISH-ARABIAN SHRIMP FISHING VENTURE TO BE MANAGED BY UNITED STATES EXPERTS:

A shrimp technologist from Atlanta, Ga., has been appointed general manager of a British firm formed to develop a shrimp fishery in the Persian Gulf. A shrimp vessel captain from Brownsville, Tex., was also slated to join the firm to act as lead skipper of an initial fleet of seven 70-foot shrimp vessels. The first of those vessels, the Ross Larkspur, was scheduled to arrive in the Middle East in early September 1965. At that time, a 200-foot refrigerated mothership for the trawler fleet was being fitted out in Florida to transport the shrimp catch. All of the vessels were to be in full operation by late 1955. (Fishing News, London, September 3, 1965.)

Note: See Commercial Fisheries Review, March 1965 p. 87.

Philippines

JAPANESE BIDS ACCEPTED ON CANNED FISH:

Japanese trading firms submitted successful bids (bids opened September 8-9, 1965) to NAMARCO (National Marketing Corporation) of the Philippine Islands for 100,000 cases of canned squid, 200,000 cases of canned mackerel, and 50,000 cases of canned saury. Bids submitted by the Japanese firms were as follows (c. & f. Manila): squid US$5.08 a case (48 15-oz. cans); mackerel $6.80 a case (48 15-oz. tall cans) and $3.80 a case (48 7.8-oz. cans); saury $5.15 a case (48 8.5-oz. oblong cans). But a September 21 report indicated that bid winners had not been determined by NAMARCO. (Kanzume Nippo, September 14, Suisan Tsushin, September 21, 1965.)

Note: Type of mackerel and saury pack not specified in article. Bids for mackerel believed to be for tomato-style pack. United States exporters were reported as having bid $8.95 a case for mackerel (48 15-oz. tall cans). Mackerel landings in Hokkaido, as of September 14, 1965, were reported to total 51,471 metric tons, up 50 percent over the same period a year ago. As of early September, Hokkaido packers had canned about 400,000 cases.

Poland

ATLANTIC FISHERIES EXPANSION:

Poland's Northwest Atlantic fisheries provided almost 40,000 metric tons of her 1964 marine catch of 244,000 tons. Only a small portion of that catch was taken on Georges Bank where only one Polish vessel operated in 1964 (with a reported catch of 720 tons): However, in August 1965, three Polish large stern trawlers (all newly built in 1964) began to fish on Georges Bank along with two Rumanian stern trawlers. Poland may expand fishing operations on Georges Bank. Poland has ambitious plans for fisheries development calling for her marine landings to double by 1970 (to 450,000 tons). To meet that goal, vessel construction plans call for the addition to the fishing fleet of about 35 large freezer and factory trawlers, 4 tuna vessels, 3 motherships, and 2 refrigerated transports. Catches in the Baltic and North Sea are to increase somewhat (to 100,000 and 120,000 tons respectively), but greater emphasis is on increasing the North Atlantic catch to 160,000 tons and the Central Atlantic catch to 70,000 tons. The long-term plans provide for another doubling of the total Polish catch to 900,000 tons by 1980.

In January 1965, the Polish fishing fleet numbered about 700 motorized vessels, most of which were small cutters (570 units). But

Poland (Contd.):

the fleet also included large factory stern trawlers (10), factory freezer trawlers (10), steam-powered trawlers (54), side trawlers (44), base ships (2), and a supply ship (1).

Note: See Commercial Fisheries Review, October 1965 p. 94 and June 1965 p. 74.

Portugal

CANNED FISH EXPORTS, JANUARY-JUNE 1965:

Portugal's total exports of canned fish in oil or sauce in the first half of 1965 were up 14 percent from those in the same period of the previous year, due mainly to larger sardine shipments.

Portuguese Canned Fish Exports, January-June 1964-1965

Product	1965 Jan.-June		1964 Jan.-June	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	28,371	1,493	23,754	1,250
Chinchards	515	27	1,693	89
Mackerel	2,076	83	1,709	68
Tuna & tunalike	1,072	36	610	20
Anchovy fillets	1,575	158	1,743	174
Others	361	19	405	21
Total	33,970	1,816	29,914	1,622

Portugal's principal canned fish buyers in the first half of 1965 were Germany with 7,500 metric tons, Italy 4,345 tons, the United Kingdom 4,251 tons, France 2,518 tons, the United States 2,622 tons, and Belgium-Luxembourg 2,435 tons. Germany's purchases of canned fish from Portugal in the first half of 1965 increased 39 percent from those in January-June 1964. Purchases by Italy and the United Kingdom were also up. But purchases by France were down. (Conservas de Peixe, August 1965.)

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CANNED FISH PACK, JANUARY-JUNE 1965:

Portugal's total pack of canned fish in oil or sauce in the first half of 1965 was down 17 percent from that in the same period of 1964. The decline was due to a sharp drop in the pack of sardines which offset an increase in the pack of other species. Portuguese sardine landings of 24,087 metric tons in January-June 1965 were down 24 percent from the 31,687 tons landed in the first half of the previous year. (Conservas de Peixe, August 1965.)

Portugese Canned Fish Pack, Jan.-June 1965

Product	1965 Jan.-June		1964 Jan.-June	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	9,181	483	17,681	930
Chinchards	501	26	476	24
Mackerel	2,071	82	1,635	65
Tuna & tunalike	4,157	138	2,176	72
Anchovy fillets	2,457	246	1,469	147
Others	1,194	63	357	19
Total	19,561	1,038	23,794	1,257

South Africa Republic

PELAGIC SHOAL FISH CATCH, JANUARY-JUNE 1965:

South Africa Republic: The Cape west coast shoal fish catch for the first 6 months of 1965 was 222,291 short tons pilchards, 42,096 tons maasbanker, 43,967 tons mackerel, 73,501 tons anchovy, and 100 tons herring. The total catch was 381,855 tons. In the same period of 1964, the total catch was 351,614 tons, made up of 257,178 tons pilchards, 19,952 tons maasbanker, 55,319 tons mackerel, 16,947 tons anchovy, and 2,218 tons herring.

In the first half of 1965, the Cape shoal catch yielded 88,424 short tons of fish meal, 3,812,919 gallons of fish body oil, 1,445 short tons of canned pilchards, 4,500 tons of canned maasbanker, and 4,933 tons of canned mackerel.

South-West Africa: In the Territory of South-West Africa, the shoal catch in January-June 1965 totaled 516,163 short tons and consisted of 515,879 tons pilchards and 284 tons anchovy. (South African Shipping News and Fishing Industry Review, August 1965.)

(Editor's Note: Total fish meal production in the South Africa Republic and South-West Africa was reported as 232,822 metric tons in January-July 1965 as compared with 190,012 tons in the same period of 1964. The 1965 canning program in South-West Africa is forecast to be about the same as in 1964 when the

South Africa Republic (Contd.):

pack of canned pilchards amounted to 62,130 short tons. The South African canned pack of other species was limited in 1964.)

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FOREIGN FISHING OPERATIONS OFF WEST COAST:

Following is a report in the Namib Times, Cape Town, September 17, 1965, on foreign fishing operations off the west coast of the South Africa Republic:

The Atlantic waters off the South Africa Republic (includes South-West Africa) are being fished by vessels from at least eight foreign countries--the U.S.S.R., Spain, Bulgaria, Ghana, Poland, Belgium, Japan, and Israel. Most of the foreign vessels are trawlers seeking groundfish.

The Soviet Union has the largest fleet off South Africa with some 39 vessels operating between Walvis Bay and the Kunene River (which is the northern boundary of South-West Africa). The Soviet catch is delivered at sea to transports, usually for shipment back to the U.S.S.R. Other foreign vessels working with the Soviet fleet also transfer catches at sea for delivery to their home country. Soviet catches are mainly confined to bottomfish, although pilchard are caught on a small scale mainly for reduction to fish meal.

Spain has some 31 vessels operating between Cape Town and Walvis Bay. The Spanish vessels are only interested in hake, and all of their catch is sent back to Spain. Walvis Bay and Cape Town are used as transshipment ports by the Spanish fleet.

Bulgaria has 2 trawlers operating off South Africa and plans to send 4 more in 1966. The Bulgarian vessels fish with the Soviet fleet. Bulgarian catches are sent back to Bulgaria.

Ghana has two vessels on lease from the Soviets operating off South Africa. Those vessels, although flying the Ghanaian flag, are manned mainly by Soviet crews and also operate with the Soviet fishing fleet.

Poland is believed to have two trawlers working off South Africa with the Soviet fleet. Up to September 1965, only one Polish trawler had called at Walvis Bay.

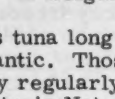
Belgium has one trawler, the Narwal, operating off South Africa. The Narwal is a regular caller at Walvis Bay where she transships her catches to Belgium.

Japan operates tuna long-line vessels in the Southeast Atlantic. Those tuna vessels call at Walvis Bay regularly for stores, water, and oil. (Editor's Note: Japan has also dispatched several trawlers to fish at various points off West Africa.)

Israel has also sent fishing vessels into the Southeast Atlantic, some of which have called at Walvis Bay.

In 1966, those 8 nations may be joined by 2 more foreign countries--Britain and West Germany. Both of those countries are said to be planning to send exploratory vessels to South African waters.

Note: See Commercial Fisheries Review, Aug. 1965 pp. 67 and 80; June 1965 p. 79; Jan. 1965 pp. 90-91; June 1964 p. 42.



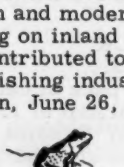
South Viet-Nam

FISHERIES AID FROM JAPAN:

In mid-1965, the Vietnamese Fisheries Directorate in Saigon received from Japan a gift of 11 female and 12 male frogs for experimental culture. If the frogs from that initial shipment, known to have been developed by scientifically selected breeding, can be successfully raised as breeding stock, an export trade could develop.

Previous shipments of silver carp and pond smelt from Japan are showing excellent results in Vietnamese fish-farming experiments.

A 7-man team of Japanese fishery experts under contract with the U. S. Agency for International Development has been operating in South Viet-Nam since 1957, working closely with the Vietnamese Fisheries Directorate. The group has worked with coastal fishing centers giving advice and assistance concerning motorization and modern fishing techniques. Working on inland fisheries as well, the team has contributed to the general rise in Viet-Nam's fishing industry. (United States Embassy, Saigon, June 26, 1965.)



Spain

SOUTH AFRICAN TRAWL FISHERY TRENDS, SEPTEMBER 1965:

The hake fishery off South Africa is attracting an increasing number of Spanish trawlers. In September 1965, some 31 Spanish trawlers were reported off the west coast of the South Africa Republic. The Spanish fishery in that area was begun in 1962 by the trawlers of a firm based at Vigo, Spain. Their success attracted other Spanish trawler operators.

The South African activities of the pioneer Vigo firm include two separate operations. It has joined with interests in the South Africa Republic to develop a fish-processing plant at Saldanha Bay to produce frozen fish sticks, fish fillets, and fish blocks, as well as industrial products. That plant may be completed by the end of 1965 and is to have its own fleet of trawlers. Entirely separate from that joint venture, however, the Vigo firm is conducting its own distant-water operations off South Africa using the Spanish stern and side trawlers which have become familiar callers at Cape Town where their hake catch is transshipped in refrigerated transports to Spain.

To help support that fleet, the Vigo firm sent the 17,000-ton factoryship Galicia to South Africa in late 1964. Anchored north of Cape in St. Helena Bay outside the 6-mile territorial limit of South Africa, the Galicia has been receiving Spanish trawler catches for processing into frozen fishery products. The factoryship also reduces fish offal into industrial products.

In September 1965, the Spanish trawlers seeking hake were moving northward toward Walvis Bay in the Territory of South-West Africa. The Vigo firm was therefore exploring the possibility of using Walvis Bay both as an anchoring site for the factoryship Galicia and as a supply and transshipping port for its trawler fleet.

Meanwhile, in early September 1965, another group of 16 Spanish trawlers from Las Palmas (Canary Islands) had already begun using Walvis Bay as a transshipment port. Those vessels were fishing for hake in waters about 10 hours steaming time off Walvis Bay. The first deliveries of the Las Palmas trawlers to Walvis Bay in early September 1965 totaled 2,200 metric tons. (Namib Times, Cape Town, September 17, 1965, and other sources.)

Note: See Commercial Fisheries Review, Jan. 1965 pp. 90-91.

U.S.S.R.

EXPANSION OF SOUTH ATLANTIC AND INDIAN OCEAN FISHERIES BASE ON THE BLACK SEA:

In 1961, the Soviet Federal Committee for Fisheries Production in Moscow established a new fisheries administration at Sevastopol on the Black Sea. Named the Sevastopol High-Seas Fisheries Administration (Sevastopolskoe Upravlenie Okeanicheskogo Rybolovstva--SUOR), the new administration has participated in the Soviet fisheries expansion into the South Atlantic and Indian Oceans.

The two main offshore fishing areas of Sevastopol fishermen are the southeastern Atlantic (Southwest African coast) and the Indian Ocean (Gulf of Aden, Arabian Sea, East African coast). Most Sevastopol ocean-going vessels are large stern trawlers of the "Tropik" class constructed in Eastern Germany specifically for tropical fishing operations. To get to their fishing grounds, Sevastopol vessels must transit the Dardanelles Straits and either the Gibraltar Straits or the Suez Canal.

In 1961, the SUOR landed 15,400 metric tons of fish and other marine products. Increased landings in subsequent years were made possible by a generous capital investment program enabling the administration to purchase by August 1965 over 40 oceangoing vessels manned by approximately 3,000 fishermen. As a result, the landings for the first 6 months of 1965 were reported as over 60,000 metric tons. Plans call for SUOR to purchase another 60 vessels by 1970. Landings will probably increase proportionately.

Expanded port facilities are needed for the growing fleet based on the Black Sea. The 5-year Plan for 1966-1970 calls for the berthing capacity of the Sevastopol port to increase from 5 large vessels to 15 vessels. A cold-storage plant has been built in the Kamysheva-ia Bay, where the headquarters of the SUOR are located. Additional cold-storage facilities and a new cannery are also planned.

Further expansion of the Sevastopol-based operations seems probable. New areas are

U.S.S.R. (Contd.):

being explored by the Soviet research vessels Gnevnii and Akademik Kovalevskii of the Soviet Black and Azov Sea Scientific Research Institute for Fisheries and Oceanography (Azcherniro). In 1965, the research vessel Gnevnii ended her research cruise to South Atlantic and Antarctic waters and Akademik Kovalevskii returned from a joint Soviet-Cuban Expedition studying the resources of the Caribbean Sea and the Gulf of Mexico. Several Soviet research vessels continuously investigate the fishery resources of the Indian Ocean.

Sevastopol fishermen will also participate in the newly-developing Soviet tuna fisheries. The Krasnii Luch, one of the five tuna factory-ships purchased by the U.S.S.R. in Japan, will be based on the Black Sea. On its maiden voyage from Japan to Sevastopol in the summer of 1965, that vessel fished successfully for tuna off Somalia's coast and landed 530 metric tons.

Note: See Commercial Fisheries Review, Nov. 1965 p. 72, and Oct. 1965 p. 97.

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LARGE VESSEL FISHING MACKEREL OFF JAPAN:

A 2,000-ton class Soviet trawler had appeared off the coast of Akkeshi, Hokkaido, fishing for mackerel in early September 1965. According to the Japanese Fisheries Agency, the Soviet Union has conducted test fishing for saury and mackerel since 1961 but this is the first time that such a large trawler has been employed for mackerel fishing. In previous years, Soviet vessels were reported fishing for saury mainly off the Kurile Islands, but in 1964 appeared for the first time as far south as 39° N. latitude off Kinkazan, Japan.

Japanese mackerel vessels operating off eastern Hokkaido are mainly vessels in the 60-ton class. These vessels are no match in fishing efficiency for the large integrated Soviet trawler. (Suisan Keizai Shimbun, September 16, 1965.)

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SOVIETS TO USE SEAWEED FOR ANIMAL FEED:

The Soviet Black Sea Fisheries Administration plans to use bottom seaweed from the Black Sea for the production of fodder meal. According to the Soviets, their research showed that Black Sea algae increase the milk output of cows, the egg output of poultry, and also speed up the growth of domestic animals. Special vessels have been constructed to harvest the seaweed. Each vessel is to produce 12 metric tons of fodder meal a day.

United Kingdom

FISHERY LOAN INTEREST RATES REVISED:

The British White Fish Authority announced that their rates of interest on loans made as from September 11, 1965, would be as follows:

For fishing vessels of not more than 140 feet, new engines, nets and gear: on loans for not more than 5 years, $7\frac{3}{8}$ percent (decrease $\frac{1}{8}$ percent); on loans for more than 5 years but not more than 10 years, $7\frac{1}{4}$ percent (decrease $\frac{1}{4}$ percent); on loans for more than 10 years but not more than 15 years, $7\frac{1}{8}$ percent (decrease $\frac{1}{4}$ percent); on loans for more than 15 years but not more than 20 years, $7\frac{1}{4}$ percent (decrease $\frac{1}{4}$ percent).

The rates on advances made before September 11, 1965, are unchanged. (The Fishing News, September 24, 1965.)

Note: See Commercial Fisheries Review, Oct. 1965 p. 98.

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LOBSTER HATCHING EXPERIMENTS IN GUERNSEY:

In the Channel Islands, the Guernsey Sea Fisheries Committee started a lobster-hatching experiment in the spring of 1965. Lobster berries (eggs) were placed within specially constructed boxes and planted in coastal waters. The lobsters were expected to hatch in about a month's time. A Guernsey fisheries officer said a critical stage in the experiment would come shortly after hatching when efforts would be made to feed the "free-floating" baby lobsters with minced calf liver.

The specially-constructed hatching boxes are about 3 feet long and have a nylon mesh shelf to hold the lobster eggs. At the port of Grand Havre, one of the boxes was planted on the ocean bottom and another was anchored 6 to 7 feet off the bottom. Two of the boxes were placed at Bordeaux harbor and others were to

United Kingdom (Contd.):

be laid in coastal waters at Portelet, Perelle, and St. Peter Port.

The experiment is a long-term project since it will take at least 6 years for the lobsters hatched in 1965 to reach the minimum 8-inch size which can be landed in Guernsey. It is hoped, however, to eventually build up lobster stocks around the Channel Islands, possibly even to the extent of having an export surplus.

A pioneer lobster hatching experiment was carried out many years ago in the Channel Islands. During the years 1899-1905, over 200,000 young lobsters were hatched and released from several stations in the islands. In 1906, a report on that experiment said, in part, "many small lobsters about 4 or 5 inches long are now found in shallow water... ." Another follow-up report in 1907 reported a good lobster catch including "a large number from 8 to 9 inches long." Unfortunately, a heat wave in 1906 apparently ended the experiment by destroying the lobster hatchery stock. (The Fishing News, London, June 25, 1965.)

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NORTH SEA CONTINENTAL SHELF AGREEMENTS WITH THE NETHERLANDS:

On October 6, 1965, the United Kingdom and the Netherlands signed two agreements relating to the exploration and exploitation of the North Sea bed between the two countries. The agreements were to be published and presented to the British Parliament in November 1965.

One agreement delimits the Continental Shelf between the two countries. It defines the dividing line broadly as a median between them, and establishes a procedure for settling any disputes which might arise over the position of the line. The second agreement relates to the exploitation of single geological structures extending across the dividing line.

The agreements follow similar ones signed with Norway on March 10, 1965. According to The Times, London, Britain also hopes to conclude such agreements with Denmark, Belgium, and France. The Times reported that negotiations with Denmark were in progress. (United States Embassy, London, October 9, 1965.)

BACK ISSUES FOR 1964 AVAILABLE

Back issues of Volume 26, Numbers 1 through 12, 1964 (January through December), are still available until the supply is exhausted. Copies are available free from the Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 No. Fort Myer Dr., Rm. 510, Arlington, Virginia 22209, The annual index for Volume 26 (1964) is also available. There are a few complete sets of Volume 26 available.

FEDERAL ACTIONS

Department of Agriculture

FARMERS HOME ADMINISTRATION

EMERGENCY LOANS TO LOUISIANA OYSTER PLANTERS FOR HURRICANE DAMAGE:

As a result of damage caused by Hurricane Betsy, the Department of Agriculture authorized emergency loans through December 31, 1966, to established oyster planters in the Louisiana Parishes of Cameron, Iberia, Jefferson, Lafourche, Livingston, Orleans, Plaquemines, St. Bernard, St. John the Baptist, St. Mary, St. Tammany, Tangipahoa, Terrebonne, and Vermilion.

The emergency loans are available through the Farmers Home Administration to enable established oyster planters to renovate their owned or leased oyster seed beds. Purpose is to help restore the oyster beds to normal. Loans may also be made to replace essential equipment needed in oyster planting operations. Oyster planters can apply for loans at the Farmers Home Administration Parish office serving their area.

To be eligible, an oyster planter must be unable to obtain the credit he needs from other local sources. He must also have suitable experience and reasonable prospects for success in the oyster-planting operations. Emergency loans are secured by a first lien on the oysters planted, on all machinery and equipment purchased, and on other chattels and real estate owned by the applicant, as necessary to protect the Government's investment. The loans bear 3 percent interest, and are expected to be paid as soon as possible consistent with the borrower's ability, but may be extended over a 3-year period.

Note: See Commercial Fisheries Review, Mar. 1963 p. 86.

Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

APPLICATIONS FOR FISHING VESSEL LOANS:

Kenneth Tapp, Tebenkof Bay, Alaska, has applied for a loan from the U. S. Fisheries Loan Fund to aid in financing the purchase of a used 36-foot wood vessel to engage in the fishery for salmon.

Jack Williford, Kenai, Alaska, also has applied for a loan to aid in financing the purchase of a new 32-foot wood vessel to engage in the fishery for salmon and halibut.

Neal J. and Jan P. MacDonald, P. O. Box 357, Petersburg, Alaska, have applied for a loan from the U. S. Fisheries Loan Fund to aid in financing the purchase of a used 49.9-foot wood seine vessel to engage in the fishery for salmon and king crab in southeastern Alaska.

Edward B. Kary, Post Office Box 8, Ilwaco, Wash., has applied for a loan from the U. S. Fisheries Loan Fund to aid in financing the purchase of a used 39-foot wood vessel to engage in the fishery for crab, tuna, and salmon.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).

In accordance with the revised regulations, notices of the respective applications of Kenneth Tapp and Jack Williford were published in the Federal Register, October 15, 1965; notice of Neal J. and Jan P. MacDonald's application was published in the Federal Register, October 23, 1965; and notice of Edward B. Kary's application was published in the Federal Register, October 28, 1965.

Eighty-Ninth Congress
(First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

CONGRESS ADJOURNS: The first session ended (adjourned sine die) Oct. 22, 1965. The second session of this Congress is scheduled to reconvene Jan. 10, 1966.

Because next year's session is merely a continuation of this year's, all legislation in the second session can be taken up at the point to which it progressed in the first session.

ANADROMOUS FISH CONSERVATION: S. Rept. 860, Conservation of the Anadromous and Great Lakes Fisheries (Oct. 11, 1965, report from the Committee on Commerce, U. S. Senate, 89th Congress, 1st session, to accompany H. R. 23), 26 pp., printed. Committee reported bill favorably with amendments. Discusses purpose, section-by-section analysis, cost, changes in existing law, and departmental reports.

Senate Oct. 13, 1965, passed H. R. 23, to initiate a cooperative program with the States for the conservation of the Nation's anadromous fish, with amendment, to be sent back to House for concurrence. Rep. Dingell explained in Congressional Record, Oct. 14, 1965 (p. 26047) the Senate's three technical amendments for which House concurrence was requested. One amendment limits the amount which may be received by any particular State in one year to the sum of $1 million, although allowing, as does the House bill, any State to receive the sum of $5 million over the life of the program which is 5 years in length. The other two amendments are technical. The second amendment simply says that the bill does not apply to the area to which the Columbia River salmon program had applied, but it says it in a little different way than the House language did. The other amendment is a very small item, striking the word "primarily" on page 2, line 4, of the House bill. Same day House concurred in the Senate amendments to H. R. 23. Would authorize the Secretary of the Interior to start with the States a cooperative 5-year program, at a total cost not to exceed $25 million, for conservation and development of anadromous fish resources and the fish in the Great Lakes that ascend streams to spawn. Federal share of a project not to exceed 50 percent. Bill in effect to June 30, 1970. This action cleared H. R. 23 for the President's signature.

H. R. 23 was signed by the President Oct. 30, 1965 (P. L. 89-304).

FISH PROTEIN CONCENTRATE PLANTS: Introduced in Senate Oct. 22, 1965, S. 2720 (Bartlett and 1 other), to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for the production by the commercial fishing industry of fish protein concentrate; to Committee on Commerce. Sen. Bartlett in Congressional Record, Oct. 22, 1965 (pp. 27135-27136) pointed out that bill would authorize the Secretary to contract with private firms for the construction and operation of large-scale experimental plants capable of producing fish protein concentrate on a commercial basis. It has been estimated that the construction and operation of five plants the size required will involve approximately $5 million. Congress appropriated during the past 2 years several million dollars for the development of a sample fish protein concentrate product in a small-scale model plant capable of producing 100 pounds daily. The basic experimental work has been carried out by the Bureau of Commercial Fisheries with the cooperation of the National Academy of Sciences. The United States has taken the lead in developing on a small scale an acceptable fish protein concentrate. The next step is to prove its economic feasibility.

FOOD STUDY AND COORDINATION COMMISSION: H. J. Res. 703 through H. J. Res. 762 were introduced in House Oct. 14, 1965; also H. J. Res. 771 (Halpern), H. J. Res. 772 (Harvey of Mich.), H. J. Res. 773 (Helstoski), introduced Oct. 19; to establish a U. S. World Food Study and Coordinating Commission to study world food and agricultural needs, to coordinate present U. S. efforts toward meeting these needs, and to evaluate the future role of U. S. agricultural and other resources in the light of present and projected world food and population trends; to Committee on Agriculture.

IMPORT STATISTICS: H. J. Res 696 (Dent) introduced in House Oct. 13, 1965, to require that reports on imports into the United States include the landed value of articles imported, and for other purposes; to Committee on Ways and Means.

MARINE BIOLOGICAL LABORATORY: H. Rept. 1160, Use of Land at La Jolla, Calif., for a Marine Biological Research Laboratory (Oct. 13, 1965, report from the Committee on Merchant Marine and Fisheries, House of Representatives, 89th Congress, 1st session, to accompany S. 1734), 5 pp., printed. Committee reported favorably without amendment. Discusses purpose, background, need for legislation, changes in existing law, and departmental reports.

House Committee on Merchant Marine and Fisheries Oct. 13, 1965, reported (H. Rept. No. 1160) on S. 1735, an act relating to the use by the Secretary of the Interior of land at La Jolla, Calif., donated by the University of California for a marine biological research laboratory, and for other purposes, without amendment; to Committee of the Whole House on the State of the Union.

House Oct. 18, 1965, passed without amendment and cleared for the President S. 1735. Signed by the President Oct 30, 1965 (P. L. 89-302). Rep. Lennon pointed out in Congressional Record, Oct. 18, 1965 (pp. 26215-26216) that the bill permits the Secretary of the Interior to reconvey the property to the regents of the University of California if and when the property was used for a purpose different from the purpose for which it was originally deeded to the Secretary of the Interior--for the construction of a Fishery-Oceanography Center.

OCEANOGRAPHIC AGENCY OR COUNCIL: H. Rept. 1025, Marine Resources and Engineering Development Act of 1965 (Sept. 17, 1965, report from the Committee on Merchant Marine and Fisheries, House of Representatives, 89th Congress, 1st session, to accompany S. 944), 23 pp., printed. Committee reported bill favorably with amendments. Discusses declaration of policy and purposes, background of the legislation, hearings, analysis, cost, departmental reports and changes in existing law.

H. R. 11579 (McGrath) introduced in House Oct. 13, 1965, to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes; to Committee on Merchant Marine and Fisheries.

Rep. Lennon inserted in Congressional Record, Oct. 22, 1965 (pp. A6063-A6065), an article titled "A New Industry For Maritime Exploration and Development," by Dr. Edward Wenk, Jr., Chief, Science Policy Research Division, Legislative Reference Service, Library of Congress. Dr. Wenk presented this address before the American Merchant Marine Conference of the Propeller Club of the United States in Galveston, Tex., on Oct. 15. He places a new perspective on our role in the oceanographic environment.

Rep. Fascell in Congressional Record, Oct. 22, 1965 (pp. A6099-A6100), pointed out that Oceanography is an area that we would do well to turn our attention to, for we can be enriched by a knowledge of our great bodies of water as we can be from the knowledge of the space which surrounds our planet. He also inserted the address by Under Secretary of the Interior, John A. Carver, Jr., to the Atlantic States and Gulf States Marine Fisheries Commission in Miami, Fla., on Oct. 6, 1965, titled "The Oceans--A Challenge to Federal-State Leadership."

SEA-GRANT COLLEGE CONFERENCE: Sen. Pell in Congressional Record, Oct. 21, 1965 (p. 27023), called attention to a unique and pioneering conference in Rhode Island on Oct. 28 and 29 in conjunction with a meeting of the National Academy of Science Committee on Oceanography. The Conference, nationwide in scope, was on the concept of establishing sea-grant colleges as a means of advancing education in the developing and immensely important field of oceanography.

STERN RAMP TRAWLERS: Introduced in House Oct. 21, 1965, H. R. 11725 (O'Neill of Mass.), to authorize the Secretary of the Interior to construct two modern stern-ramp trawlers to be used for experimental commercial fishing, research, and for other purposes; to Committee on Merchant Marine and Fisheries.

SHELLFISH SHELLING EMPLOYEE EXEMPTION: Introduced in Senate Oct. 19, 1965, S. 2671 (Thurmond), to amend the Fair Labor Standards Act of 1938 in order to exempt employees employed in the shelling of shellfish from the minimum wage provisions of such act; to Committee on Labor and Public Welfare. Proposes an amendment to section 13 (a) (5) of the Fair Labor Standards Act of 1938, as amended. That section is codified as title 29, section 213 (a) (5) of the United States Code, and is one of the exemptions written into the Fair Labor Standards Act. It now exempts from the minimum wage and maximum hour sections of the Act "any employee employed in the catching, taking, propagating, harvesting, cultivating, or farming of any kind of fish, shellfish, crustaceas, sponges, seaweeds, or other aquatic forms of animal and vegetable life, or in the first processing, canning or packing such marine products at sea as an incident to, or in conjunction with, such fishing operations, including the going to and returning from work and loading and unloading when performed by any such employee." The bill would add after the word "harvesting" the following: "including shelling in the case of shellfish." Prior to the 1961 amendments to the Act, all employees engaged in harvesting, processing, or canning operations in the seafood industry were exempted from coverage of the act. The 1961 amendments severely limited the exemption and has resulted in coverage for minimum wages only, of some employees who have never before earned as much as the minimum wage. This has caused a severe hardship in some of the smaller operations in the industry. Sen. Thurmond inserted in Congressional Record, Oct. 19, 1965 (p. 26344), an article: "North Carolina: Minimum Wage Blamed For Industry Failure."

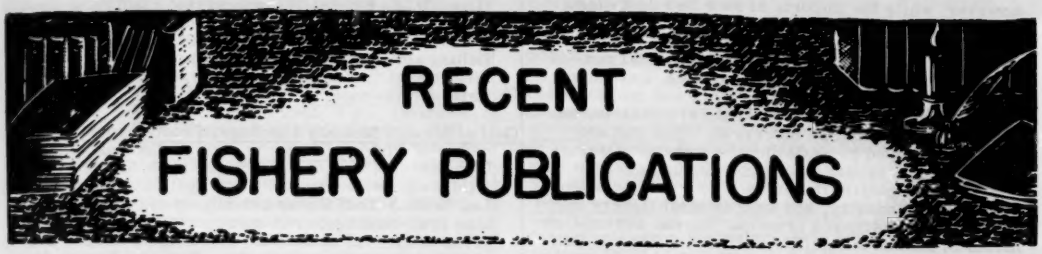
SUPPLEMENTAL APPROPRIATIONS FOR FY 1966: Hearings before Subcommittees of the Committee on Appropriations, United States Senate, 89th Congress, 1st session, 1,167 pp., printed. Under the Department of State includes funds to replace facilities of the International Pacific Halibut Commission on or near the campus of the University of Washington, Seattle. In exchange for a grant of $500,000, the University will provide 12,000 square feet of space in their new Oceanography Building, and will supply heat, light, janitor service for 40 years; after that time contract will be renegotiated.

H. Rept. 1162, Supplemental Appropriation Bill 1966 (Oct. 13, 1965, report from the Committee on Appropriations, House of Representatives, 89th Congress, 1st session, to accompany H. R. 11588), 55 pp., printed. Committee reported favorably with various amendments.

H. R. 11588 (Mahon) introduced in House Oct. 13, 1965. Reported (H. Rept. 1162) from Committee on Appropriations Oct. 13; passed House Oct. 14. Reported (S. Rept. 912) in Senate Oct. 19, by Committee on Appropriations; Senate Oct. 20, 1965, passed with amendment (motion to reconsider tabled) H. R. 11588, accepting a number of Committee amendments, including one which provides $500,000 for office and other facilities for the North Pacific Halibut Commission. Senate insisted on its amendments, asked for conference with House, and appointed conferees. Same day House disagreed to Senate amendments, agreed to conference requested by Senate, and appointed conferees.

The conferees Oct. 21, 1965, agreed to file a conference report (H. Rept. 1198) on the differences between the Senate- and House-passed versions of H. R. 11588. On the same day the report was filed in the House and the Senate. After the House receded from its disagreement to and concurred with Senate amendment 70 (regarding the Halibut Commission facilities funds), it adopted the conference report and sent the legislation to the Senate. The Senate also adopted the conference report and cleared the bill for the President's signature. H. R. 11588 was signed by the President Oct. 31, 1965 (P. L. 89-309).

VESSEL "GONE FISHIN IV": H. R. 11589 (Fascell) introduced in House Oct. 13, 1965, to permit the vessel Gone Fishin IV to be documented for use in the fisheries and coastwise trade; to Committee on Merchant Marine and Fisheries.



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR - FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number Title

CFS-3776 - Packaged Fishery Products, 1964 (Revised), 5 pp.
CFS-3829 - Massachusetts Landings (by Gear and Subarea), 1964 Annual Summary, 16 pp.
CFS-3860 - Gulf Coast Shrimp Data, January 1965, 15 pp.
CFS-3871 - New York Landings, May 1965, 5 pp.
CFS-3874 - Maryland Landings, May 1965, 4 pp.
CFS-3876 - Michigan, Ohio & Wisconsin Landings, April 1965, 4 pp.
CFS-3877 - Michigan, Ohio & Wisconsin Landings, May 1965, 4 pp.
CFS-3883 - South Carolina Landings, June 1965, 3 pp.
CFS-3884 - New Jersey Landings, June 1965, 3 pp.
CFS-3886 - Maine Landings, June 1965, 4 pp.
CFS-3887 - California Landings, April 1965, 4 pp.
CFS-3888 - California Landings, May 1965, 4 pp.
CFS-3891 - Shrimp Landings, February 1965, 5 pp.
CFS-3892 - Gulf Coast Shrimp Data, February 1965, 15 pp.
CFS-3893 - Alabama Landings, June 1965, 3 pp.
CFS-3894 - Texas Landings, April 1965, 2 pp.
CFS-3895 - New York Landings, June 1965, 4 pp.
CFS-3896 - Rhode Island Landings, April 1965, 3 pp.
CFS-3898 - Mississippi Landings, April 1965, 3 pp.
CFS-3906 - Florida Landings, July 1965, 8 pp.
CFS-3907 - Louisiana Landings, June 1965, 3 pp.
CFS-3909 - California Landings, June 1965, 4 pp.
CFS-3914 - Mississippi Landings, May 1965, 2 pp.

SL- 36 - Wholesale Dealers in Fishery Products, Iowa (Mississippi River and Tributaries), 1964 (Revised), 2 pp.

SL-116 - Firms Canning Food for Animals, from Marine-Animal Products, 1964 (Revised), 4 pp.

SL-102 - Firms Canning Maine Sardines, 1964 (Revised), 1 p.

Sep. No. 744 - Distribution, Abundance, and Size of Sablefish (Anoplopoma fimbria) Found in Deep Water Off the Mouth of the Columbia River.

Sep. No. 745 - Shrimp Potential of the Eastern Gulf of Guinea.

SSR-Fish. No. 513 - Comparison of Vertebral Counts of Atlantic Menhaden, by Fred C. June, 14 pp., illus., June 1965.

Annual Report of the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N. C., for the Fiscal Year Ending June 30, 1964, Circular 215, 29 pp., illus., June 1965. Summarizes the research work carried out by the laboratory during Fiscal Year 1964, including blue crab, menhaden, shad, and Atlantic Coast striped bass programs.

The Big Bite--Commercial Fisheries of the Middle Atlantic Coast, Conservation Note 17, 8 pp., illus., Feb. 1965. Although the number of Middle Atlantic Coast fishermen (27,000-28,000 recently) has not changed much since the 1930's, landings have nearly doubled in size and have increased fivefold in value in that time. In a recent year, the catch of fish and shellfish totaled more than 1.5 billion pounds, worth nearly $60 million to the fishermen, according to this leaflet. Included is information on the economic value of shellfish (oysters, clams, scallops, blue crab, and northern lobster); finfish fisheries--for porgy, alewives, flounders, striped bass, shad, butterfish, whiting, sea bass, and cod; and the new fisheries for tuna and swordfish.

Characteristics of Fish Populations in Upper Mississippi River Backwater Areas, by Lyle M. Christenson and Lloyd L. Smith, Circular 212, 56 pp., illus., March 1965.

Effects of Pesticides on Fish and Wildlife--1964 Research Findings of the Fish and Wildlife Service, Circular 226, 83 pp., Aug. 1965.

A Fisherman Looks at Reservoirs, by Charles E. Most, Circular 227, 16 pp., illus., June 1965.

Pesticide-Wildlife Studies by States, Provinces, and Universities, An Annotated List of Investigations Through 1964, Circular 224, 31 pp., May 1965.

Report of the Bureau of Commercial Fisheries for the Calendar Year 1963, 115 pp., illus., printed, 1965. From 1950 through 1962 the United States domestic catch of food fish was gradually declining and her imports growing to over a hundred percent. In 1963,

however, while the imports of food fish decreased, the percentage of the total supply of edible fishery products derived from imports remained about the same. As the population increases the total consumption of fishery products increases, and unless the United States is to become more and more dependent on foreign nations for fishery products, the domestic catch must be increased. This can and must be achieved by assisting the domestic fishing industry. The report touches on developments in 1963 in the domestic fisheries, Federal legislation affecting the industry, and international fishery matters. It also discusses principal Bureau accomplishments in the North Pacific, California, Hawaii, Gulf of Mexico, Atlantic Coast, and Great Lakes regions; research and development programs in foreign fishing explorations, international oceanographic expeditions, fish protein concentrate, new products from fish oil, irradiation of fishery products, effects of pesticides on fisheries, U. S. standards for fishery products and certification service, transportation facilities, shrimp futures on Chicago Mercantile Exchange, canned tuna promotion program, and others; financial assistance programs; work of the American Fisheries Advisory Committee; and cooperation and coordination with International, Federal, State, and other agencies. Included are discussions of the organization, employment, budget, and physical property of the Bureau; and a listing of publications written by its employees. Appendixes contain statistics of United States fisheries; organizations with which the Bureau had research and development contracts; and data on the Fisheries Loan Fund.

Treatment Tips: How to Determine Quantities for Chemical Treatments in Fish Farming, Circular 209, 16 pp., July 1965.

PUBLICATIONS AVAILABLE FREE FROM THE BRANCH OF STATISTICS, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 505, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number	Title
CFS-3902 (HS No. 1)	- Imports of Fish Meal and Scrap, 1937-1964, 6 pp.
CFS-3903 (HS No. 2)	- U. S. Fish Meal and Scrap Production, 1929-1964, 5 pp.
CFS-3904 (HS No. 3)	- Foreign Trade in Fish and Marine-Animal Oils, 1925-1964, 10 pp.
CFS-3905 (HS No. 4)	- Menhaden Fishery, 1873-1964, 7 pp.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, August 1965, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated

California Fishery Market News Monthly Summary, Part II - Fishing Information, August 1965, 9 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, July and August 1965, 9 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, oil, and solubles; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex., from Mexico; and sponge sales; for the months indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, August 1965, 4 pp. (Market News Service, U.S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, July and August 1965, 21 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

Receipts of Fresh and Frozen Fishery Products, New York City's Wholesale Fulton Fish Market, by Transport Method, 1938-1964, 4 pp., 1965. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.)

Research Leads to Improved Harvesting-Processing-Marketing of Commercial Farm Pond Fish, Newsletter to Industry, 15 pp., illus., processed, Aug. 16, 1965. (Regional Office, U. S. Bureau of Commercial Fisheries, 5 Research Dr., Ann Arbor, Mich. 48103.) Discusses in detail results of research projects to assist farm pond fish producers: (1) final testing of a method for seining such fish as buffalofish and catfish from ponds up to 2,000 feet wide filled with water up to 8 feet deep; (2) successful handling of live catfish with a mechanical conveyor; (3) additional storage testing of buffalofish and catfish products; (4) a unique method for making a marketable product out of processing wastes and rough fish; (5) continuation of consumer education and market development activ-

ities such as fish cookery demonstrations and distribution of fish recipes to food editors; and (6) compilation of a list of live-fish dealers and consumers.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, August 1965, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

Selected Species of Fresh-Water Fish of the Chicago Market, compiled and edited by C. E. Cope, 12 pp., illus., Sept. 1965. (Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 610 S. Canal St., Chicago, Ill. 60607.)

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

Bibliography on Reservoir Fishery Biology in North America, by Robert M. Jenkins, Research Report 68, 61 pp., printed, 1965, 40 cents.

Bulrushes and Bulrushlike Plants of Eastern North America, by Neil Hotchkiss, Circular 221, 21 pp., illus., processed, May 1965, 20 cents.

Distribution of Alaskan Mammals, by Richard H. Manville and Stanley P. Young, Circular 211, 77 pp., illus., printed, 1965, 50 cents. Among the mammals described and in some cases, illustrated (including maps showing their range) are cetaceans--whales and porpoises; pinnipeds--sea lions and several species of seals; and the river and sea otters.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ABALONE:
"El abulón Californiano" (The California abalone), by Keith W. Cox, article, Pesca y Marina, vol. 17, no. 4, Aug.-Sept. 1965, pp. 4, 6-11, illus., printed in Spanish. Fernando Flores Limitada, 705 N. Windsor Blvd., Los Angeles 38, Calif.

AFRICA:
Market Profiles for Africa, OBR 65-43, 40 pp., printed, June 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

ANCHOVIES:
"Izmenenie razmerov ikry khamsy (Engraulis encrasicholus ponticus Alex.) v techenie nerestovogo sezona" (Variation in size of eggs of Black Sea anchovies, Engraulis encrasicholus ponticus Alex., during the spawning season), by T. V. Lugovaya, article, Trudy Sevastopol'skoi Biol. Sta. Akad. Nauk Ukr. SSR, vol. 16, 1963, pp. 364-388, printed in Russian. Trudy Sevastopol'skaia Biologicheskaia Stantsiia, Akademiia Nauk SSSR, Leningrad, U.S.S.R.

ANTARCTIC:
Antarctic Research Series, Volume 1--Biology of the Antarctic Seas, edited by Milton O. Lee, Publication No. 1190, 196 pp., illus., printed, 1964, $10. American Geophysical Union, Suite 506, 1145 19th St. NW., Washington, D. C. 20036. The first volume in the Antarctic Series deals with a number of marine studies. (Papers included in this series are original contributions too lengthy or otherwise unsuitable for publication in standard scientific journals. The material will be directed not only to scientists actively engaged in research work but to graduate students and scientists in closely related fields as well. The books in the series will serve both as references for the specialist and as sources of information for anyone acquainted with the biological and physical sciences.) This volume contains papers on: "Primary organic production in the Drake Passage and Bransfield Strait," by Sayed Z. El-Sayed, Enrique F. Mandelli, and Yukio Sugimura; "Primary productivity under sea ice in Antarctic waters. 1--Concentrations and photosynthetic activities of microalgae in the waters of McMurdo Sound, Antarctica; 2--Influence of light and other factors on photosynthetic activities of Antarctic marine microalgae," by J. S. Bunt; and "Respiratory metabolism and ecological characteristics of some fishes in McMurdo Sound, Antarctica," by Donald E. Wohlschlag. Also included are: "Temperature responses and tissue respiration in Antarctic crustacea with particular reference to the krill Euphausia superba," by M. A. McWhinnie; "Antarctic foraminiferal zonation," by Orville L. Bandy and Ronald J. Echols; and "Improved techniques for benthic trawling at depths greater than 2,000 meters," by Robert J. Menzies. An appendix consists of a catalogue and bibliography of Antarctic and Sub-Antarctic benthic marine algae.

ARCTIC:
"Arctic Biological Station," by Mark Ronayne, article, Trade News, vol. 18, no. 1, July 1965, pp. 22-24, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

ARGENTINA:
Following are from the series Contribucion del Instituto de Biologia Marina, printed in Spanish. Instituto de Biologia Marina, Mar del Plata, Argentina.

Algunos Datos sobre la Biologia de la Anchoita del Sector Bonacrense (Resultados Preliminares) (Some Data on the Biology of the Anchovy of the Bonacrense Area--Preliminary Results), by Maria Luisa Fuster de Plaza, No. 22, 1964.

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Los Recursos Pesqueros en America Latina (Sumario) (The Fishery Resources in Latin America--Summary), No. 23, 1964.

Resultados Preliminares de las Campanas de Pesca Exploratoria de Langostines y Camarones en Rawson, 1962-1963 (Preliminary Results of the Exploratory Fishing Cruises for "Langostines" and Shrimp at Rawson, 1962-63), by Enrique Beschi, No. 21, 1964.

Variaciones Estacionales de la Fauna Ictica del Area de Pesca de Mar del Plata (Seasonal Variations in the Marine Fauna of the Fishing Area of Mar del Plata), by Alberto Nani, No. 24, 1964.

ASIA:
Market Profiles for the Near East and South Asia, OBR 65-37, 20 pp., printed, June 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

AUSTRALIA:
Australian Journal of Marine and Freshwater Research, vol. 16, no. 2, July 1965, 126 pp., illus., printed, single copy 10s. (about US$1.40). Editorial and Publications Section, CSIRO, Sixth Floor, 372 Albert St., East Melbourne C2, Australia. A few of the articles are: "Studies on the physiology of a shrimp Metapenaeus sp. (Crustacea: Decapoda: Penaeidae). IV--Carbohydrate metabolism; V--Calcium metabolism," by W. Dall; and "The ecology of six species of littoral gastropod molluscs. II--Seasonal variations in the six populations," by A. K. O'Gower and G. R. Meyer.

Australian Seafoods Buyer's Guide, 1965, 16 pp., illus., printed, 1965. Trade Publicity Branch, Department of Trade and Industry, Melbourne, Australia. An outstandingly attractive booklet designed for overseas importers of Australian spiny lobster, shrimp, abalone, oysters, scallops, and tuna. A full-color illustration of each species, together with a short explanation of landings, seasonal supplies, grading and packaging, and export requirements, is provided. Information on Australian export control regulations, current export markets, and worldwide Australian trade commissioner posts is also included.

AUSTRIA:
Market Factors in Austria, by John A. Cantwell and Elroy B. Thiel, OBR 65-51, 12 pp., printed, July 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

BIOLOGIST:
Fishery Biologist and Wildlife Biologist, Announcement No. 285B, 12 pp., printed, revised April 1964. Board of Civil Service Examiners, Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C. 20240. A brochure on positions for fishery and wildlife biologists in the U. S. Fish and Wildlife Service. Covers location of positions, description of work, minimum education requirements, special provisions for satisfying basic educational requirement, combination of superior academic achievement and subsequent professional experience, general and special requirements, general information, and how to apply for a position.

BLACK SEA:
Ryby Chernogo Morya (Fishes of the Black Sea), by A. N. Svetovidov, 551 pp., illus., printed in Russian, 1964, 3 Rubles, 30 Kop. (about US$3.65). Nauka, Moscow, U.S.S.R.

BOTULISM:
Botulism and Fishery Products, by J. M. Shewan and D. C. Cann, Torry Advisory Note No. 22, 7 pp., printed, May 1965. Torry Research Station, 135 Abbey Rd., Aberdeen, Scotland.

BRAZIL:
Pesca, Estrutura e Producao, 1963 (Fishing Industry, Composition and Production, 1963), 37 pp., processed in Portuguese, March 1965. Servicio de Estatistica da Producao, Departamento Economico, Ministerio da Agricultura, Rio de Janeiro, Brazil. Contains statistical tables showing number of fishermen, fishery products landings by type of gear, quantity and value of fish landings by class, and other data for 1962/63.

Revista Nacional da Pesca, vol. 6, no. 42, May-June 1965, 32 pp., illus., printed in Portuguese. Revista Nacional da Pesca, Av. Ipiranga, 890, 8º Andar, Sao Paulo, Brazil. Two of the articles are: "Panorama da pesca em Santa Catarina" (View of the fishery in Santa Catarina), by E. Tremel; and "Petróleo no conteúdo estomacal da sardinha" (Petroleum in the stomach contents of the sardine), by M. Nino de Moraes.

SUDENE--Boletim de Estudos de Pesca, vol. 4, no. 2, March-April 1964, 16 pp., printed in Portuguese. Grupo Coordenador do Desenvolvimento da Pesca (GCDP), SUDENE, Edf. Entreposto Federal de Pesca, Cais de Santa Rita, 8º Andar, Recife, Pernambuco, Brazil. Two of the articles are: "Artesanato de pesca no Nordeste" (Technique of fishery in the Northeast); and "A pesca em Pernambuco, Parte I" (The fishery in Pernambuco, Part I), by Osiris Lira.

CANADA:
Journal of the Fisheries Research Board of Canada, vol. 22, no. 4, July 1965, 232 pp., illus., printed, single copy C$2.25. Queen's Printer, Ottawa, Canada. "Ketone bodies in the blood of salmonoid fishes," by R. E. E. Jonas and E. Bilinski; "Sedimentation in a salmon stream," by S. Philip Shapley and Daniel M. Bishop; "Rancidity in lean fish muscle. IV--Effect of sodium chloride and other salts," by C.H. Castell, Jill MacLean, and Barbara Moore; "Estimates of the theoretical biomass of juvenile winter flounder, Pseudopleuronectes americanus (Walbaum), required for a fishery in Rhode Island," by Saul B. Saila, Donald B. Horton, and Richard J. Berry; "Partial freezing as a means of preserving Pacific salmon intended for canning," by N. Tomlinson and others; "Records of mollusca from the Northwest Atlantic obtained by Canadian fishery research vessels, 1946-61," by J. A. Allen; "Movements of hatchery-reared lake trout in Lake Superior," by Richard L. Pycha, William R. Dryer, and George R. King; "Time-lapse photography of an ASDIC echo-sounder PPI-scope as a technique for recording fish movements during migration," by

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

C. Groot and W. L. Wiley; "The role of behavior in the ecology and interaction of underyearling coho salmon (Oncorhynchus kisutch) and steelhead trout (Salmo gairdneri)," by G. F. Hartman; "Preliminary results on the seasonal size distribution of Mytilicola orientalis and the effect of this parasite on the condition of the Pacific oyster, Crassostrea gigas," by K. K. Chew, A. K. Sparks, and S. C. Katkansky; and "Predation on Lobsters (Homarus americanus) by Anonyx sp. (Crustacea, Amphipoda)," by D. J. Scarratt.

CASPIAN SEA:
"Vosproizvodstvo rybnykh zapasov Kaspiya v svyazi s gidrostroitel'stvom" (Propagation of the fish stocks in the Caspian, in connection with hydroelectric construction), by N. I. Kozhin, article, Trudy Okeanog. Komis Akad. Nauk SSSR, vol. 5, 1959 pp. 251-256, printed in Russian. Trudy Okeanograficheskoi Komissii, Akademiia Nauk SSSR, Moscow, U.S.S.R.

CATFISH:
"Age and growth studies of channel catfish in western Lake Erie," by Gerardu C. De Roth, article, The Journal of Wildlife Management, vol. 29, no. 2, 1964, pp. 280-386, printed. Wildlife Society, 2000 P St. NW., Washington, D. C.

CAVIAR:
"Crisis in the caviare trade," article, Australian Fisheries Newsletter, vol. 24, no. 8, Aug. 1965, p. 31, printed. Fisheries Branch, Department of Primary Industry, Canberra A.C.T., Australia. Describes some of the problems of Soviet caviar producers--poor quality and declining production. Faced with an ever-growing shortage of this gourmet food, the Russians have resorted to sturgeon farming, particularly at Sevruga. There, in enclosed lagoons on the Caspian Sea, the fish farmers are planting the fertilized sturgeon eggs and rearing the fry to considerable size before they are liberated into the Sea. The operation has resulted in stabilizing production from year to year.

CLAMS:
"The economics of dredging quahogs in Rhode Island," by Andreas A. Holmsen, article, Maritimes, vol. 9, no. 3, Summer 1965, pp. 10-13, illus., printed. Graduate School of Oceanography, University of Rhode Island, Kingston, R. I. 02881.

COD:
"Artificial propagation of cod," by Gunnar Dannevig, article, Fiskeridirektoratets Skrifter, Serie Havundersokelser, vol. 13, no. 6, 1963, pp. 73-79, illus., printed in Norwegian. Fiskeridirektoratet, Bergen, Norway.

"Blood properties of aquatic vertebrates. I--Total blood volume of the Atlantic cod, Gadus morhua L.," by K. Ronald and others, article, Canadian Journal of Zoology, vol. 42, no. 6, 1964, pp.1127-1132, printed. Division of Administration, National Research Council, Sussex St., Ottawa 52, Canada.

"Changes in the Southern Gulf of St. Lawrence cod fishery," by A. C. Kohler, article, Trade News, vol. 18, no. 1, July 1965, pp. 14-15, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

"Industria da pesca do bacalhau" (Cod fishing industry), article, Jornal do Pescador, vol. 27, no. 319, Aug. 1965, pp. 17-19, printed in Portuguese, single copy 5 escudos (about US$0.20). Casas dos Pescadores, R do S. Bento, 644, 2°, Lisbon, Portugal.

"Parasites of young cod in the Barents Sea" (O parazitofaune molodi treski v Barentsevom more.), by Yu. I Polyanskii and I. V. Kulemina, article, Biological Abstracts, vol. 45, no. 11, 1964, Abstract No. 45261, printed. Biological Abstracts, 3815 Walnut St., Philadelphia 4, Pa.

"Protein denaturation in frozen fish. X--Changes in cod muscle in the unfrozen state, with some further observations on the principles underlying the cell fragility method," by R. M. Love and others, article, Journal of the Science of Food and Agriculture, vol. 16, May 1965, pp. 259-267, printed, single copy £1 17s. 6d. (about US$5.25). Society of Chemical Industry, 14 Belgrave Sq., London SW1, England.

"Utkast av torsk fra tralfangster" (Rejection of cod from trawler landings), by Arvid Hylen, article, Fiskets Gang, vol. 51, no. 30, July 29, 1965, pp. 433-435, illus., printed in Norwegian with English abstract. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

Reprints from Zeitschrift fur Fischerei und Deren Hilfswissenschaften, vol. 11, 1962-63, printed in German with Russian and English summaries. Neumann Verlag, 19 Dr. Schmincke Allee, Radebeul 1, Germany.

"Beobachtungen an einer Kiemenbogengeschwulst, einer Leibeshohlencyste und Eingeweideverwachsungen beim Ostseedorsch (Gadus morhua L.)" (Observations on a Gill-Arch Tumor, a Body Cavity Cyst, and Intestinal Growths of the Baltic Sea Cod), by Meinhild Berner, 8 pp., illus. (from no. 3/4, pp. 175-182).

"Ergebnisse der Markierungsexperimente am Ostseedorsch (Gadus morhua L.) in der Bornholm- und Arkonasee 1959" (Results of Marine Experiments on Baltic Sea Cod in the Bornholm and Arkona Seas 1959), by Meinhild Berner, 10 pp., illus. (from no. 5/6, pp. 453-462).

CONSERVATION:
Federal Aid in Fish and Wildlife Restoration (Annual Report on Dingell-Johnson and Pittman-Robertson Programs for the Fiscal Year Ending June 30, 1964), 92 pp., illus., printed, 1965. Sport Fishing Institute, Bond Bldg., Washington, D. C. 20005. Presents a short program review of expenditures and projects (including sport fish restoration) operated during FY 1964, and statistical tables on individual conservation projects, land purchases, hunting and fishing licenses issued by the states, and other related data.

CONSUMER EDUCATION:
Processed informative leaflets available from the Agricultural Extension Service, Washington State University, Pullman, Wash. 99163.

Washington Fresh Seafood Calendar, E.M. 2507, 1 p., Feb. 1965.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

When You Buy Food--the Meat Group (Meat, Poultry, Fish . . .), E.M. 2495, 2 pp., Feb. 1965.

When You Buy Seafood, E.M. 2510, 3 pp., illus., March 1965.

CUBA:
Las Pesquerias de Cuba y Algunas Recomendaciones para su Intensificacion (The Fisheries of Cuba and Some Recommendations for Their Improvement), by Hermann Ritzhaupt, Contribucion No. 21, 110 pp., illus., printed in Spanish, Feb. 1965. Centro de Investigaciones Pesqueras, Instituto Nacional de la Pesca, Havana, Cuba.

CZECHOSLOVAKIA:
Buletin VUR Vodnany, vol. 1, no. 1, Jan.-March 1965, 39 pp., illus., printed in Czechoslovak with English table of contents and abstracts. Fisheries Research Institute, Vodnany, Czechoslovakia. The first issue of a new quarterly concerned with the fresh-water fisheries of Eastern Europe. Some of the articles are: "The tasks of Fisheries Research Institute Vodnany," by J. Tvrzicky; "The tasks of the State Fisheries in the coming years," by J. Tesarcik;" "Prospects of the liquidation of the most important diseases of fish in fish-ponds under the conditions of Czechoslovakia," by M. Vejvoda; "A portable electric apparatus for the catching of fish," by V. Janecek and F. Reiser; "Report from the Symposium on Freshwater Fishery in Yugoslavia"; and "The latest completed research tasks of the Fisheries Research Institute Vodnany."

DENMARK:
Fiskeriberetning for Året 1964 (The Ministry of Fisheries Annual Report for 1964), 134 pp., illus., printed in Danish with English summary, August 1965, Kr. 7.50 (about US$1.10). Fiskeriministeriet, 1 Kommission Hos, G.E.C. Gad, Copenhagen, Denmark. Contains reports and statistical tables on fishermen, fishing craft and gear; landings from marine-waters--including cost of supplies and gear; catch in lakes, rivers, and ponds--including fish culture data; processed fish--catch and export data for more than 30 food fish are given; and domestic consumption, exports, and imports of fishery products. Also includes information on organization of the Fisheries Ministry and on legislation pertaining to fisheries.

EAST AFRICA:
"Joint venture in fishing industry," article, Spear, vol. 7, no. 3, June 1965, pp. 62-64, illus., printed. East African Railways and Harbours, Nairobi, Kenya. An agreement signed in April 1965 in Dar es Salaam established for the first time a Tanzanian-Japanese commercial venture in the fishing industry. Its objective is the promotion and development of the hitherto nearly untouched fisheries and so increase the production of valuable protein foods for local consumption from Indian Ocean waters off the East African Coast. The company has a fleet of 9 vessels--a 50-ton refrigerated mothership-trawler, a 30-ton refrigerated stern trawler, two 5-ton stern trawlers, and five 21-foot open fishing boats. Two of the boats, are used for training African fishermen. With a capital investment of £100,000 (about US$279,000), the new joint venture company plans to convert the facilities of a sister company into a modern fish-processing plant. Also projected is the establishment of a tuna base with the construction of a pier capable of handling oceangoing vessels. An adjacent cold-storage plant will have a capacity of 2,000 tons of fish.

EEL:
"Quest for the true breeding area of the American eel (Anguilla rostrata LeSueur)," by Vadim D. Vladykov, article, Journal of the Fisheries Research Board of Canada, vol. 21, no. 6, 1964, pp. 1523-1530, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

ELECTRICAL FISHING:
"Fish better - electrically," by Murray G. Johnson, article, Ontario Fish & Wildlife Review, vol. 3, no. 1, 1964, pp. 9-12, printed. Department of Lands and Forests, Parliament Bldg., Toronto 5, Canada.

"K voprosu 'vidovoi' chuvstvitel'nosti ryb k elektricheskomu toku" ("Specific" sensitivity of fish to electric current), by N. V. Bodrova and B. V. Kryaukhin, article, Byul. Inst. Biol. Vodokhran. Akad. Nauk SSSR, vol. 5, 1959, pp. 26-31, printed in Russian. Akademiia Nauk SSSR, Moscow, U.S.S.R.

ESTUARINE FISH:
"Some effects of a synthetic detergent on estuarine fishes," by Ronald Eisler, article, Transactions of the American Fisheries Society, vol. 94, no. 1, 1965, pp. 26-31, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

FISH BEHAVIOR:
"A study of fish behavior in an electric field" (Issledovanie povedeniya ryby v elektricheskom pole), by L. M. Nusenbaum and T. I. Faleeva, article, Biological Abstracts, vol. 45, no. 13, 1964, Abstract No. 54199, printed. Biological Abstracts, 3815 Walnut St., Philadelphia 4, Pa.

FISH DISEASES:
"Studies on the diseases of marine-culture fishes. I--General description and preliminary discussion of fish diseases at Mie Prefecture; II--Pharmacodynamic effects of nitrofurazone for fish diseases (1)," by Saburoh S. Kubota and others, articles, Journal of the Faculty of Fisheries, vol. 6, no. 1, 1963, pp. 107-144, illus., printed. Journal of the Faculty of Fisheries, Prefectural University of Mie, Tsu, Japan.

FISHERIES RESEARCH:
Research in Fisheries, 1964, Contribution no. 184, 73 pp., printed, 1965. University of Washington, Fisheries Research Institute, Seattle, Wash. 98105.

FISHERY AGREEMENT:
Japan-Republic of South Korea Fisheries Agreement, 62 pp., printed in Japanese, 1965. Government of Japan, Tokyo, Japan.

FISH FINDER:
"Fish finding by automatic unmanned devices," article, World Fishing, vol. 14, no. 8, Aug. 1965, pp. 39-40, printed, single copy 3s. 6d. (about US$0.55). Grampian Press Ltd., The Tower, 229-243 Shepherds Bush Rd., Hammersmith, London W6, England.

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FISHING WITH LIGHTS:

"Results of the study of pelagic fish fauna in the Pacific and Indian Oceans by using electric lights to attract fishes," by N. V. Parin, article, Trudy Instituta Okeanologii, vol. 62, 1963, pp. 128-144, printed in Russian. Trudy Instituta Okeanologii Akademiia Nauk SSSR, Izdatel'stvo Akademii Nauk SSSR, Moscow, U.S.S.R.

FISH MEAL:

"Feed value of fish meals," by Kuman Saruya and others, article, Chemical Abstracts, vol. 61, Sept. 14, 1964, Abstract No. 7622d, printed. The American Chemical Society, 1155 16th St. NW., Washington, D.C. 20005.

FISH OIL:

"Studies on the fish oils (from fish) caught in the Inland Sea of Japan. I--On the oils from Harengula zunasi, Saurida and halfbeak," by Seiichi Ueno and Shigero Hamada, article, Journal of Japan Oil Chemists' Society, vol. 11, no. 10, 1963, pp. 526-532, printed. Japan Oil Chemists' Society, Department of Applied Chemistry, Faculty of Engineering, University of Tokyo, Motofujicho, Bunkyo-ku, Tokyo, Japan.

Available from The American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006:

"Neutralization of technical fish oil by anion-exchange resin EDE-10P and its regeneration," by K. M. Ol'shanova and G. V. Frolova, article, Chemical Abstracts, vol. 61, Aug. 17, 1964, Abstract No. 4603d, printed.

"Volatile acids from menhaden oil," by J. R. Chipault and E. McMeans, article, Journal of Agricultural and Food Chemistry, vol. 13, 1965, pp. 15-17, printed.

FISH POPULATIONS:

"Some further remarks on the methods of estimating fish populations" (Jeste k metode odhadu velikosti rybi osadky), by Ota Oliva, article, Biological Abstracts, vol. 45, no. 13, 1964, Abstract No. 54348, printed. Biological Abstracts, 3815 Walnut St., Philadelphia 4, Pa.

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"Shark meat flour," by Haq S. Abdul and S. Mahdihassan, article, Pakistan Journal of Scientific and Industrial Research, vol. 3, 1960, pp. 213-215, printed. Pakistan Council of Scientific and Industrial Research, 3/4/D/VI, Nazimabad, Karachi, Pakistan.

FISH STOCKS:

Contributions to Symposium, 1963, on the Measurement of Abundance of Fish Stocks, edited by J. A. Gulland, Rapports et Proces-Verbaux des Reunions, vol. 155, 223 pp., printed, 1964. International Council for the Exploration of the Sea (ICES), Charlottenlund-Slot, Denmark.

FOOD AND AGRICULTURE ORGANIZATION:

The Food and Agriculture Organization has published reports describing that Agency's activities under the Expanded Program for Technical Assistance for developing the fisheries of many countries. These reports have been processed only for limited distribution to governments, libraries, and universities. Food and Agriculture Organization of the United Nations, via delle Terme di Caracalla, Rome, Italy.

Report to the Government of Nigeria on Investigations of Brackish-Water Fish Culture in the Niger Delta, by T. V. R. Pillay, FAO/EPTA Report No. 1973, 41 pp., processed, 1965.

Report of the FAO/IPFC Training Centre on Mackerel and Tuna Research, Cronulla, November 2-27, 1964, FAO/EPTA Report No. 1977, 11 pp., processed, 1965.

Report to the Government of Ghana on Biological Investigation of Fisheries Resources, by Miroslav Zei, FAO/EPTA Report No. 2001, 34 pp., processed, 1965.

FOOD CONSUMPTION:

U. S. Food Consumption, Sources of Data and Trends, 1909-63, Statistical Bulletin No. 364, 198 pp., illus., processed, June 1965. Economic Research Service, U. S. Department of Agriculture, Washington, D. C. 20250. Contains, among data on many other foods, statistical tables and explanations on per capita consumption (edible weight) of fishery products, 1909-63; and supply and utilization of commercial fishery products (edible weight), 1929-63.

FOOD PRESERVATION:

Food Preservation (Except by Irradiation), SB 412, Supp. 2, 15 pp., printed, Feb. 1965. Federal Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Sts., Springfield, Va. 22151.

FOOD PROCESSING:

Canned and Cured Seafood, SIC Code 2031, Industry Series, Preliminary Report, 1963 Census of Manufactures, 4 pp., processed, 10 cents. Bureau of the Census, U. S. Department of Commerce, Washington, D. C. 20233. Presents data on canned and cured seafood plants, employees, value added by manufacture, value of production, and general statistics. During 1963, processors of canned and cured seafoods produced products valued at $452 million, an increase of 16 percent over 1958, according to preliminary results of the 1963 Census of Manufactures. Average employment in the industry showed an increase of 1 percent from 1958 to a total of 17,300 employees in 1963. Value added by manufacture amounted to $175 million in 1963, an increase of 34 percent over 1958. The industry includes processors engaged in cooking and canning fish, shrimp, oysters, clams, crabs, and other fish and shellfish; and in smoking, salting, drying, and otherwise curing fishery products.

Food Processing Operations--Their Management, Machines, Materials, and Methods, Vol. 3, by Maynard A. Joslyn and J. L. Heid, 565 pp., illus., printed, 1964, domestic $19.75, foreign $20.75. The Avi Publishing Co., Inc., P. O. Box 388, Westport, Conn. The third and final volume of this series on food processing offers technical information on procurement, special ingredients, processing techniques, pumping, package engineering, and waste utilization and disposal. Some of the processing techniques featured are grinding, freezing, freeze-drying, vacuum concentration, and frying. Engineering aspects of heat transfer, freeze

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dehydration, and packaging are discussed in detail. The chapter on preservation by freezing discusses the handling of fish, among other foods, fish and shrimp--freezing methods and equipment; packaging; chemical changes in frozen foods; and the future of the frozen food industry. The chapter on processing aspects of freeze dehydration covers raw materials, preparation for freezing, effects of freezing conditions on freeze-dried products, effects of dehydration conditions on product quality, packaging of freeze-dried foods, storage, rehydration, and marketing. A short chapter on plant location and design reviews the dominant locative factors--raw materials and supplies, markets, transportation, labor, site environment, power and fuel, capital, and taxes; and considerations in plant design--site, buildings, and equipment. The final chapter points out what is needed for a food processing industry to succeed, among which are cooperation and teamwork in making best possible use of available resources. "Survival and growth depend upon the alertness, flexibility, judgment and actions of management in relation to changing conditions in raw materials, processes, products, markets, and competition," states the author. Each chapter has a complete bibliography, and the index for the book is quite adequate. Food technologists, food processors, or handlers of all types of food products will find this, as well as the first two volumes, to be a valuable handbook. (For reviews of vols. 1 and 2 see Commercial Fisheries Review, August 1963 p. 135; and May 1964 p.91.)

FRANCE:

"La pêche Française en Méditerranée" (The French fishery in the Mediterranean), by Claude Morin, article, France Pêche, no. 97, July-Aug. 1965, pp. 25-26, illus., printed in French, single copy 2.5 F. (about US$0.50). France Pêche, Boite Postale 179, Lorient, France.

Articles from La Pêche Maritime, vol. 44, no. 1048, July 1965, printed in French, single copy 14 F. (about US$2.85). Les Editions Maritimes, 190, Blvd. Haussmann, Paris, France:

"Conjoncture plutot mauvaise au cours du premier semestre" (Rather bad situation during the first half-year), by L. Plouas, pp. 527, 529, 530.

"La production et la commercialisation des produits surgeles in 1964" (The production and marketing of frozen fishery products in 1964), pp. 555, 556.

FREEZE-DRYING:

"Freeze drying 12-fold increase by 1970," by Kermit Bird, article, Food Processing, vol. 26, March 1965, pp. 75-77, 92, printed. Putnam Publishing Company, 111 E. Delaware Pl., Chicago 11, Ill.

FREEZING ON BOARD:

"North American experience in chilling and freezing fish on board vessels," by Joseph W. Slavin and W. A. MacCallum, article, Proceedings of the XI International Congress of Refrigeration, vol. II, 1964, pp. 931-940, printed. International Institute of Refrigeration, 177 blvd. Malesherbes, Paris (17e), France.

GERMAN FEDERAL REPUBLIC:

Baubeschreibung des Fischerei-Forschungsschiffes WALTHER HERWIG Erbaut bei der A. G. WESER, Werk Seebeck (Construction Description of the Fishery Research Vessel Walther Herwig), 139 pp., processed in German, 1965. Der Bundesminister dur Ernahrung, Landwirtschaft und Forsten, Unterabteilung Fischwirtschaft, 2 Hamburg-Altona 1, Federal Republic of Germany.

"Det tyske fiskeri in 1964" (The German fishery in 1964), by Vagn Korsboek, article, Fiskeribladet, vol. 57, no. 5, Aug. 1965, pp. 73, 75, printed in Danish. W. Bamberger, Kobenhavns Fisketorv, Copenhagen V, Denmark.

EAST GERMANY:

Deutsche Fischerei-Zeitung, vol. 12, no. 7, July 1965, 32 pp., illus., printed in German. Deutsche Fischerei-Zeitung, Muggelseedamm 310, Berlin-Friedrichshagen, German Democratic Republic. Some of the articles are: "Methoden der steigerung der teichfischproduktion in Israel" (Methods of increasing pond fish production in Israel), by F. Wolny; and "Neuerungen in der Zugnetzfischerei" (Innovations in the drag-net fishery), by E. Schlieker.

GREAT LAKES:

Fishes of the Great Lakes Region, by Carl L. Hubbs and Karl F. Lagler, 272 pp., illus., printed, revised edition 1964, $6.95. The University of Michigan Press, Ann Arbor, Mich. Originally published in 1947, this book is a reprint of the 1958 edition with some corrections in the text and new material in the preface for 1964. The new preface includes revisions of some technical names of fishes and additions to the fish fauna of the Great Lakes through discovery and through intentional and inadvertent introduction. The opening sections discuss the waters of the Great Lakes region and their fish associations; zoogeography of the region; postglacial dispersal of fish; field study and the collecting of fish; their preservation for study; and identification of fish--anatomical features, and terms and methods of counting and measuring, and key to the families of Great Lakes fish. Most of the text is devoted to descriptions of the 29 families of Great Lakes fish, with keys to species and subspecies. Forty-four full-color plates and 251 black and white sketches add interest and clarity. A complete bibliography and an adequate index are included. This book will be useful to both sport and commercial fishermen, as well as to students of aquatic biology.

HAWAII:

A Proposed Program for Hawaiian Fisheries, by Vernon E. Brock, 18 pp., Technical Report Series No. 6, processed, 1965. Hawaii Marine Laboratory, University of Hawaii, Honolulu, Hawaii. Discusses the problem of the Hawaiian fisheries--a decline in the number of fishermen from 2,500 in the postwar period to fewer than 1,000 in 1960--caused by increases in operating costs, rises in incomes from competing occupations, and stabilization of fish prices. The solution of the dilemma must be found in a substantial reduction in the cost of catching fish, states the author. He then outlines the nature of the Hawaiian fishery resources: the oceanic fish--sharks, marlin, flyingfish, and tuna; minor fishery resources--inshore and bottomfish fisheries; and other possible fishery resources--culture of oysters, clams, and shrimp. The final section offers suggestions on what needs to be done by the Federal or State government to improve the Hawaiian fisheries.

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HERRING:

Reprints from Zeitschrift fur Fischerei und Deren Hilfswissenschaften, vol. 11, 1962-63, printed in German with Russian and English summaries. Neumann Verlag, 19 Dr. Schmincke Allee, Radebeul 1, Germany.

Die Fruchtbarkeit der Fruhjahrs- und Herbstheringe aus den Gewassern um Rugen (The Fecundity of the Spring and Fall Herring from the Waters around Rugen Island), by Karl Anwand, 11 pp., illus. (from no. 5/6, pp. 463-473).

Vergleichende Untersuchungen an Fruhjahrs- und Herbstheringen aus den Gewassern um Rugen (Comparative Investigations on Spring and Fall Herring from the Waters around Rugen Island), by Karl Anwand, 39 pp., illus. (from no. 3/4, pp. 211-249).

Das Wachstum der Fruhjahrs- und Herbstheringe aus den Gewassern um Rugen (The Growth of Spring and Fall Herring from the Waters around Rugen Island), by K. Anwand, 9 pp., illus. (from no. 3/4, pp. 201-209).

ICELAND:

Articles from Iceland Review, vol. 3, no. 2, 1965, single copy Kr. 65 (about US$1.50). Iceland Review, P.O.B. 1238, Reykjavik, Iceland:

"Atlantic Fishing," pp. 59-60. Summarizes highlights of the Icelandic fisheries during 1964. Total Icelandic catch was 971,574 metric tons, an increase of 24 percent over 1963. The fishing fleet was expanded by 49 new vessels, bringing the gross tonnage total to 79,032, not including open motorboats. Cod landings totaled 273,607 tons, as compared with 206,281 tons the previous year. Total value of fishery products exports during 1964 was Kr. 4,384 million (about US$102 million) compared with Kr. 3,727 million (about $87 million) in 1963.

"Foreign fishing off Iceland," by David Olafsson, pp.38-40. Describes the historical and current activities of foreign fishing vessels near Iceland. During the past 30 years, the British, Norwegian, and German vessels have predominated. Their combined catches have averaged more than 90 percent of the total landed by all foreign fishermen off Iceland.

ICHTHYOLOGY:

Fishes and Their Ways, by Clarence J. Hylander, 256 pp., illus., printed, 1964, $4.95. The Macmillan Co., Front & Brown Sts., Riverside, N. J. This is the final volume in the author's Young Naturalist Series. It is a book about the fish found in the streams and lakes of the United States and in the seas bordering its shores. The introductory chapter defines a fish and describes attributes common to all. Considerable detail is provided on the body design and covering of a fish, how it swims, fins and their uses, the colors and size of fish, where they live, and how they are classified. There follows a chapter dealing with how fish live--their feeding habits, how they adjust to their surroundings, how they protect themselves, their family life and migration. Succeeding chapters are devoted to different groups of fish: the freshwater game fish such as salmon, catfish, pike, sunfish, and perch; other fresh-water fish--minnows, sticklebacks, sturgeon, and gar; and the salt-water game fish--the sea bass, drum, snapper, porgy, mackerel, mullet, jack, and many others. Commercial marine fish including herring, smelt, cod, and flounder are described; followed by chapters about colorful tropical fish--the butterflyfish, grunt, filefish, and moray eels; strange sea creatures--pufferfish, sea robin, flyingfish, and pipefish; and the cartilaginous fish--lamprey, many families of shark, the skate, the stingray, and the manta. Included are a short but adequate bibliography and an index to common and scientific names of fish. Although intended as a textbook for Junior and Senior High School students, this book will be a useful addition to any general or home library.

IMPORTS:

U. S. Imports for Consumption and General Imports, 1964 (Tariff Schedules Annotated by Country), 535 pp., processed, July 1965, $2. Bureau of the Census, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Among all the other products are included quantity and value of fish and fishery products imported into the United States during calendar year 1964, by type and by country.

INDIA:

Establishing a Business in India, by Celia Herman, OBR 65-48, 20 pp., printed, July 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

INDUSTRIAL PRODUCTS:

"Production of fish oil and fish meal," by R. R. Brenner, article, Chemical Abstracts, vol. 60, Feb. 17, 1964, Abstract No. 4698e, printed. The American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

INTERNATIONAL COMMISSIONS:

International Commission for the Northwest Atlantic Fisheries, Statistical Bulletin for the Year 1963, vol. 13, 87 pp., illus., printed, May 1965. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P. O. Box 638, Dartmouth, N. S., Canada. This bulletin is divided into two parts: Part 1 summarizes statistics on fishery landings from the Convention area, 1952-63; Part 2 includes statistical tables dealing with the fisheries in 1963. Included are data on landings by species, country, and geographical division; landings of principal species (cod, haddock, ocean perch, halibut, flounder, other groundfish, herring, and other pelagic fish) by month and division; landings by species and subarea; fishing effort and landings by division, month, gear, and country; and effort and landings by country, gear, and subarea. Member countries are Canada, Denmark, France, Germany, Iceland, Italy, Norway, Poland, Portugal, Spain, U.S.S.R., United Kingdom, and the United States.

North-East Atlantic Fisheries Commission, Report of the Third Meeting, May 1965, 47 pp., processed in French and English, 1965. North-East Atlantic Fisheries Commission, Rm. 617, East Block, Whitehall Pl., London SW1, England. Reports on the proceedings of the Third Meeting of the North-East Atlantic

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Fisheries Commission, in Moscow, May 11-14, 1965. Delegations attended from 13 of the 14 European member Governments; the United States Government, the Food and Agriculture Organization of the United Nations, the International Council for the Exploration of the Sea, and the International Commission for the Northwest Atlantic Fisheries sent observers. The Special Committee on International Control, established at the 1964 meeting, reported on its findings; the Commission then resolved that Contracting States should (within the limits of their respective jurisdictions) inspect foreign vessels to find out whether they have been complying with the Commission's recommendations on mesh size and other items, and report results of inspection to the Flag States and the Commission. The Commission also agreed that the Committee should continue its work during the coming year to determine the feasibility of introducing a system of international inspection on the high seas effective Jan. 1, 1967. Other resolutions were taken concerning minimum mesh size and top-side chafers in various parts of the Convention Area.

JAPAN:

Bulletin of the Hokkaido Regional Fisheries Research Laboratory, no. 29, Nov. 1964, 130 pp., illus., printed in Japanese with English abstracts. Hokkaido Regional Fisheries Research Laboratory, Yoichi, Hokkaido, Japan. Some of the articles are: "On the gill-net mesh selectivity curve. II," by T. Ishida; "The fishing condition of the squids, Ommastrephes sloani pacificus (Steenstrup), in the coastal area off Cape of Esan of the Hokkaido in autumn," by M. Kawasaki; "Larvae of decapold crustacea of Hokkaido. 5--Paguridae (anomura); 6--Lithodidae (anomura); 7--Porcellanidae (anomura); 8--Dorippidae (brachyura)," by H. Kurata; "Food and feeding habit of Pacific salmon (Genus Oncorhynchus) in their oceanic life," by J. Ito; "Studies on methods to prevent oxidative deterioration in saury meals," by K. Miwa and T. Tokunaga; and "Studies on the development of dimethylamine and formaldehyde in Alaska pollock muscle during frozen storage," by T. Tokunaga.

Available from Hokkaido Fisheries Experimental Station, 238 Banchi, Hamanaka-cho, Yoichi, Hokkaido, Japan.

Hokusuishi Geppo (Hokkaido Fisheries Experimental Station Monthly), vol. 22, no. 6, June 1965, 48 pp., printed in Japanese.

_____, vol. 22, no. 7, July 1965, 46 pp., printed in Japanese.

Available from the Fisheries Agency, Ministry of Agriculture and Forestry, 2-1 Kasumigaseki, Chiyoda-ku, Tokyo, Japan.

Fisheries Agency's Budget Appropriation Requests by Items for Fiscal Year 1966 (April 1966-March 1967), 41 pp., printed in Japanese, July 1965.

Suisancho Shuho (Weekly Report of the Fisheries Agency), vol. 16, no. 11, July 1965, 109 pp., printed in Japanese.

Present State and Prospects of Agricultural and Fishery Products for Export, 1965 Annual, 347 pp., printed in Japanese, June 1965. JETRO, 1-banchi, 1-chome, Higashi Shinbashi, Minato-ku, Tokyo, Japan.

KOREA:

Annual Report for Fishery Products Inspection, 1964, 230 pp., illus., printed in Korean and English. Central Fisheries Inspection Station, Ministry of Agriculture and Forestry, 103 Wonnam-Dong, Chong-Ro, Seoul, Korea.

LAKE TROUT:

"The lake trout are back," by Walter R. Crowe, article, Michigan Conservation, July-Aug. 1965, vol. 34, no. 4, pp. 2-7, illus., printed. Michigan Conservation, Lansing, Mich. 48926. Explains how, with effective lamprey control, the lake trout populations in Lake Superior are being rehabilitated. Electrical barrier weirs and even more efficient lampriades applied to tributary streams have reduced the numbers of trout-destroying sea lampreys. In addition, starting in the late 1940's Michigan fisheries workers began collecting lake trout eggs for development as hatchery brood stock to accomplish eventual restocking of Lake Superior.

LATIN AMERICA:

Market Profiles for the American Republics, OBR 65-55, 24 pp., printed, July 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

Market Indicators for Latin American Republics, by Selina Caldor and others, OBR 65-41, 28 pp., illus., printed. June 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

LOBSTER:

About Lobsters, by T.M. Prudden, 172 pp., illus., printed, 1962, $5. The Bond Wheelwright Co., Porter's Landing, Freeport, Maine. In simple, non-technical language, the author reviews all that is known about the lobster. A brief portrait of a lobsterman is followed by the introductory chapter on the nature of lobsters, history of the industry, sources of lobsters, effect of fresh water, habitat, migration, effect of water temperature on the catch, direct relation between increase in fishing effort and total catch, the lobster's senses, molting, breeding habits, food, enemies, diseases, and measuring a lobster. Next is a chapter on means of catching lobsters, care of pots, plugs and bands, buoys, trawling, and British methods of lobster fishing. Succeeding chapters discuss use of artificial bait; techniques for maintaining artificial sea water in inland tanks, including charts showing symptoms and probable causes of death of lobsters in recirculated holding systems, and the DO's and DO NOT's of profitable operation; tidal pounds; shipping of lobsters; preservation of lobster meat; and Pacific Coast transplanting and artificial rearing in hatcheries. The final chapters include information on marketing of lobsters; biological and gear research; and preparing and cooking. A short bibliography completes this book which will interest commercial and sport fishermen, dealers, processors, retailers, as well as the general reader.

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PE Triples Life of Lobster Traps, 2 pp., illus., printed. (Reprinted from Modern Plastics, Dec. 1964.) McGraw-Hill, Inc., 770 Lexington Ave., New York, N.Y. 10021. The switch from wooden cages to molded polyethylene "igloos" may help move Canada's East Coast lobster fisheries out of the marginal industry class.

MANATEE:
"El manati Africano" (The African manatee), by Aurelio Basilio, article, Iberica, vol. 43, no. 37-38, July-Aug. 1965, pp. 258-260, illus., printed in Spanish, single copy 30 ptas. (about US$0.50). Iberica, Palau, 3, Apartado 759, Barcelona-2, Spain.

MARINE BIOLOGY:
The Biological Bulletin, vol. 129, no. 1, Aug. 1965, 216 pp., illus., printed, single copy $3.75. The Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. Two of the articles are: "Chromosomes of two species of quahog clams and their hybrids," by R. Winston Menzel and Margaret Y. Menzel; and "Growth and survival of postlarval Penaeus aztecus under controlled conditions of temperature and salinity," by Zoula P. Zein-Eldin and David V. Aldrich.

MARINE FARMING:
"Five acres of fish," by Ruth Halliday, article, New Scientist, vol. 27, no. 455, Aug. 5, 1965, pp. 330-331, illus., printed, single copy 1s. 3d. (about US$0.20). Cromwell House, Fulwood Pl., High Holborn, London WC1, England. Explains how a small bay in western Argyllshire, Scotland, is now being converted into Britain's first experimental marine fish farm. A small inlet was enclosed by a dam and the first fish stocked in August 1965. The 5-acre pond could lead the way to great changes in the British marine fisheries if results of experimental work being done there under supervision of the White Fish Authority are encouraging. Operation of a farm will provide an opportunity to collect data on behavior and reaction of plaice, and to measure growth under different feeding regimes. The plaice is marketable when it reaches a length of about 25 cm. (about 9.8 inches), which takes 4-5 years in the sea. But with suitable feeding, temperature control, and breeding this length may be achieved in only 2 years in ponds.

MARKETING:
Comparative Costs to Consumers of Convenience Foods and Home-Prepared Foods, by Harry H. Harp and Denis F. Dunham, Marketing Research Report No. 609, 94 pp., illus., processed, June 1963. Marketing Economics Division, Economic Research Service, U. S. Department of Agriculture, Washington, D. C. 20250. This comprehensive report contains cost and yield data for 247 food forms. Aside from factors such as comparative eating quality, the yield and cost data developed in this study make available for the first time to consumers and researchers a basis for making accurate cost comparisons on a large number of foods in various market forms. Among many other foods compared for cost per serving, different market forms of fish and shellfish were compared using yield data and standard home recipes supplied by the National Home Economics Research Center, U. S. Bureau of Commercial Fisheries. Quarterly prices were collected for the calculation of the cost per serving. The size of serving of each market form was based on the weight of ready-to-serve foods. The convenience forms of fish studied were frozen fried codfish sticks, frozen haddock fish sticks, canned Alaska red sockeye salmon, frozen haddock fish dinner, and canned fish flakes. The convenience forms of frozen crab cakes, canned crab meat, frozen deviled crab, frozen shrimp creole, frozen raw peeled deveined shrimp, canned shrimp, frozen raw breaded shrimp, and prefried breaded frozen shrimp were studied.

MARYLAND:
Maryland Board of Natural Resources, Twentieth Annual Report, 1963, 204 pp., printed. Board of Natural Resources, State Office Bldg., Annapolis, Md. Some of the work of the Board of Natural Resources during 1963 included functions of the Departments of Tidewater Fisheries and Game and Inland Fish, and the Water Pollution Control Commission. The report discusses research and management conducted by those agencies and others; new legislation introduced in the Maryland General Assembly, including that pertaining to commercial fisheries; and the conservation budget, 1962/63.

MOTION PICTURES:
Strictly Stripers, 16 mm. film, running time 19 minutes, color, sound, on loan, or for sale at $105. Natural Resources Institute, University of Maryland. College Park, Md. 20742. This film tells the life story of striped bass (Roccus saxatilis) from the time that large females deposit millions of eggs in the muddy waters of estuaries such as that of the Patuxent River to the climatic moment when that succulent fish is placed on a dinner table. It highlights the economic and recreational importance of striped bass which are eagerly sought by sport and commercial fishermen, fish markets, and consumers alike. Moreover it presents a cross-section of the estuarine and biological research done by the Laboratory to ensure the future of the striped bass and other fish and shellfish in Chesapeake Bay.

MUSSELS:
"Bacteriological control of mussels in the growing and in the fully grown stage," by A. M. Wedard, article, Rivista Italiana d'Igiene, vol. 23, no. 3, 1963, pp. 157-168, printed in Italian. Nistri Lischi, Piazza del Castellette, No. 7, Pisa, Italy.

NETS:
"On the mechanical characters of the sweeping trammel net. I," by Ko Matuda, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 29, Feb. 1963, pp. 135-138, printed. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

NEW ENGLAND:
"The New England fishing industry: Part I--A new technology," by Frederick W. Bell, article, New England Business Review, Aug. 1965, pp. 2-9, printed. Federal Reserve Bank of Boston, Boston, Mass. Discusses the impact of the introduction of stern trawling on the declining New England fishing industry. Widely used for several years in Europe, Canada, and the Far East, stern trawlers are only now coming into use in the United States. Supporters maintain that those vessels overcome many of the side trawlers' disadvantages, save time, and reduce dan-

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ger to the crews. Profitability of the Narragansett, first stern trawler operated out of a New England port, has been high, with increased construction costs somewhat balanced by larger catches per unit of effort. Stern trawling should be the technique of the future, asserts the author. Its adoption, however, will depend on its ability to attract capital.

NEW ZEALAND:

Report of the Marine Department for the Year Ended 31 March 1965, 54 pp., printed, 1965, 2s. (about US$0.30). R. E. Owen, Government Printer, Wellington, New Zealand. Much of this report is concerned with the commercial fisheries of New Zealand during the Fiscal Year 1965. Included is information on total quantity and value of fishery products marketed in calendar year 1964, spiny lobster fishery, fishing vessels and personnel, landings by species, methods of capture, landings by ports, foreign trade in fishery products, sport fishing, fish-liver oil production, and whaling. Also discusses the rock and dredged oyster fisheries, whitebait fishing, mussels, research and investigation, demonstrations of Japanese gear, Fishing Industry Advisory Council, Freshwater Fishery Advisory Council, Fishing Industry Board, and legislation pertaining to commercial fishing

NORTH ATLANTIC:

"North Atlantic co-operation," by G. J. Gillespie, article, Trade News, vol. 18, no. 1, July 1965, pp. 3-5, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Although no specific conservation recommendations were made, the 15th annual meeting of the International Commission for the Northwest Atlantic Fisheries in Halifax in June conveyed the idea that conservation studies have high priority in its future programming. The week-long meeting of the 13-nation fisheries body was opened by the Canadian Minister of Fisheries. He stated that protection of northwest Atlantic seal herds was of particular interest to Canada. One of the more important decisions made at the meeting provided for a joint environmental survey of Georges Bank and a 5-nation research program in the Atlantic salmon fisheries. The subject of Atlantic salmon came to the fore through Canada's concern in the sudden increase in the salmon catch by Greenland fishermen. The meeting also recorded progress toward eventual establishment of international enforcement of fishing regulations in the northwest Atlantic with the exchange of inspection visits by enforcement officers of Canada, the U. S., and the U.S.S.R.

NORWAY:

Fishing Gear and Processing Plant from Norway, 1965 (a special edition of Norway Exports), 64 pp., illus., printed. The Export Council of Norway, Drammensveien 40, Oslo 2, Norway. Presents descriptions of fishing gear, vessels, and processing equipment on display at the International Fishing Exhibition, Trondheim, Aug. 19-29, 1965, and the Norwegian Design Center, Oslo, July-Sept. 1965.

"La Norvege a produit l'annee derniere 128,000 t de poisson surgele" (Norway produced 128,000 metric tons of frozen fish last year), article, La Peche Maritime, vol. 44, no. 1048, July 1965, pp. 533-535, illus., printed in French, single copy 14 F. (about US$2.85). Les Editions Maritime, 190, Blvd. Haussmann, Paris, France.

Selling in Norway, by Grant Olson and Ann C. Holmes, OBR 65-61, 8 pp., printed, Aug. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

NUTRITION:

Meat, Fish, Poultry, and Cheese: Home Preparation Time, Yield, and Composition of Various Market Forms, by Gladys L. Gilpin, Home Economics Research Report No. 30, 71 pp., illus., printed, Aug. 1965, 45 cents. Human Nutrition Research Division, Agricultural Research Service, U. S. Department of Agriculture, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Reports on a comprehensive cooperative investigation undertaken to obtain information on some of the basic factors that contribute to the convenience and satisfaction derived from different forms of food. Preparation time, yield, composition, and other quality characteristics for meat, fish, poultry, and cheese items were investigated in home-prepared and commercially prepared market forms. Thirty-six different kinds of foods in various forms to make a total of 95 food items were included. Proximate composition determinations were made on 31 kinds and preparation forms of fish and shellfish products. Quantitative analysis was made of moisture content, fat, protein, ash, and total carbohydrate and energy value. The information gained will be useful in preparing guides for homemakers and others responsible for planning, selecting, and preparing economical and nutritious diets, as well as in developing standards for commercially-prepared foods.

OCEANOGRAPHY:

"Aportaciones españolas durante 1963 a la oceanografía pura y aplicada, nacional e internacional" (Spanish contributions during 1963 to pure and applied national and international oceanography), by Fernando Lozano, article, Boletin Real Sociedad Española de Historia Natural, vol. 62, no. 1, 1964, pp. 99-113, printed in Spanish. Real Sociedad Espanola de Historia Natural, Paseo de la Castellana, 84, Madrid, Spain.

Bibliography on Physical Oceanography of the Indian Ocean, by Parkash Samuel, Special Bibliographies on Oceanography Contribution No. 2, 137 pp., processed, June 1965. American Meteorological Society, Washington, D. C. The scope of this bibliography is limited to the different aspects of physical oceanography--temperature, density, salinity, chemical composition, waves, currents, circulation, methods of measurement, instruments, and related topics. Papers on bottom topography, geology, and biology have been excluded.

The Gulf Stream (A Physical and Dynamical Description), by Henry Stommel, 261 pp., illus., printed, Second Edition, April 1965, $6. University of California Press, 2223 Fulton St., Berkeley, Calif. 94720. This is the second edition of an authoritative text on the oceanography of the Gulf Stream with an added chapter covering information acquired since 1958 and

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recommendations based on that data. The opening chapter deals with the early explorations and ideas of the Gulf Stream, from its discovery by Ponce de Leon in 1513 until the early 20th Century. Succeeding chapters explain in technical language the methods of observation used in the Gulf Stream--the reversing bottle, reversing thermometers, bathythermograph, bathypitotmeter, propeller-type current meters, towed electrodes, air-borne radiation thermometer, and loran; the geostrophic relationship (balance of forces); large-scale features of the North Atlantic circulation; the hydrography of the Gulf Stream; and the wind system over the North Atlantic. Mathematical equations and oceanographic charts are used abundantly in the chapters on linear theories of the Gulf Stream (including the theory of wind-driven ocean currents); nonlinear theories of the Gulf Stream; meanders in the Stream; fluctuations in the currents (including seasonal and long-period fluctuations); and role of the thermohaline circulation (circulation pattern of water caused by changes in temperature and salinity). A chapter of general remarks contains observations on the nature of oceanographic research as well as on the dynamics of the Gulf Stream. "There is scarcely any more firmly rooted idea in the mind of the layman than the notion that the Gulf Stream keeps the European climate warm. So long as it was believed that the Gulf Stream was a river of warm water, this idea did make sense. It is no longer possible to be so certain of the direct climatological influence of the Gulf Stream, for it now seems that it is not so much the Stream itself that is important, as the position and temperature of the large mass of warm water on its right-hand flank," explains the author. Although intended primarily to explain what is known about the Gulf Stream in a way which will interest physical scientists, the book should be valuable to all oceanographers as well as to geographers. The book has an adequate index and a good bibliography.

"Man tests his limits in the ocean's depths," article, Business Week, no. 1880, Sept. 11, 1965, pp. 66-68, 70, illus., printed, single copy $0.50. McGraw-Hill, Inc., 330 W. 42nd St., New York, N. Y. 10036. Presents highlights of the U. S. Navy's Sealab II project conducted by 3 groups of aquanauts in a stationary pressurized cylindrical tank 205 feet below the Pacific Ocean's surface off La Jolla, Calif., during September-October 1965. The 45 days of experiments, both in and out of the underwater laboratory, add up to the most extensive effort yet to measure man's capability to live and work for long periods under the sea. Though tied to shore, Sealab II is expected to open new worlds for marine biologists and geologists. By staying down for 15 days at a time, the aquanauts carried out research that, were they operating from the surface, would take years to complete. The project leader stated that the next steps in the Navy's deep submergence projects will be to try for greater depths, first to 400 feet with Sealab II, then to 600 feet, and then possibly to 1,000 feet.

"Marine science ship in Mombasa," article, Spear, vol. 7, no. 3, June 1965, pp. 54-57, illus., printed. East African Railways and Harbours, Nairobi, Kenya. Describes the West German Government's new oceanographic research vessel Meteor, which visited Mombasa, Kenya, in early 1965. West Germany has now joined the 20 nations which will have sent 47 research ships to take part in the International Indian Ocean Expedition when it completes its 6-year program at the end of 1965. The 2,740-ton vessel, which began her tropical service late in 1964 in the Red Sea, has accommodations for 24 scientists in 12 laboratories, is fitted with equipment for making extensive hydrographic and meteorological observations, and has the capacity for great maneuverability provided by a propeller-activated rudder.

"Oceanographic observations from the Eastern Pacific Ocean collected by the R/V Shoyo Maru, October 1963-March 1964," by Eric D. Forsbergh and William W. Broenkow, article, Inter-American Tropical Tuna Commission Bulletin, vol. 10, no. 2, 1965, printed. Inter-American Tropical Tuna Commission, La Jolla, Calif. 92038.

Oceanography of the Grand Banks Region and the Labrador Sea in 1964, by Ronald C. Kollmeyer and others, Oceanographic Report No. 10, CG 373-10, 291 pp., illus., printed, June 1965. United States Coast Guard, Washington, D. C.

"Standardizing oceanographic instrumentation is practical," by James L. Verber, article, Under Sea Technology, vol. 6, no. 8, Aug. 1965, pp. 20-21, printed, single copy $1. Compass Publications Inc., 617 Lynn Bldg., 1111 N. 19th St., Arlington, Va. 22209.

Articles in Geo Marine Technology, vol. 1, no. 8, Aug. 1965. INTEL, Inc., 1075 National Press Bldg., Washington, D. C. 20004:

"Alvin"; "Aluminaut," pp. 16-18, illus.

"Sealab II," by Ralph G. Platt, pp. 7-13, illus. The United States' most ambitious attempt to date to learn how life can be sustained in a marine environment was carried out in fall 1965. Sealab II, an underwater vehicle, rested 205 feet deep on the Pacific Ocean bed, a half-mile off La Jolla, Calif., and in it 3 teams of 10 aquanauts each lived, worked, and were subjected to many physiological and psychological tests. The results of the 45-day program may be as important to the future of mankind as the forays made to date into "outer space," says the author. Sealab II was the second phase of the Navy's "Man-in-the-Sea" program, and was conducted by the Office of Naval Research in collaboration with the Navy's Special Projects Office, as part of the Deep Submergence Systems Program. Sealab I was conducted in 1964, 30 miles off Bermuda, when 4 Navy divers lived and worked successfully at a depth of 193 feet for 11 days. The article includes details of Sealab's construction, operation, and objectives, and the day-by-day aquanaut schedule.

"Vision-ingenuity-sweat," by E. W. Seabrook Hull, pp. 20-24, illus. Tells the story of Bears Bluff Laboratory, Wadmalaw Island, S. C.

OYSTERS:

El Ostion Antillano, CRASSOSTREA RHIZOPHORAE Guilding, y su Cultivo Experimental en Cuba (The Antilles Oyster and its Experimental Culture in Cuba), by Braulio A. Saenz, Nota Sobre Investigaciones No. 6, 34 pp., illus., printed in Spanish with English abstract, April 1965. Centro de Investigaciones Pesqueras, Instituto Nacional de la Pesca, Havana, Cuba.

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PERU:

La Pesca Peruana en 1963 (The Peruvian Fishery in 1963), by Lizandro Bedoya Esponda, Serie de Divulgacion Cientifica 24, 41 pp., illus., printed in Spanish. As in previous years, the Peruvian annual fisheries report for 1963 consists largely of statistical tables showing quantity and value of industrial products production; utilization of fish landed in Peru; domestic consumption of fishery products; processed fishery products; investment in the fishing and fish-processing industries; production of frozen and canned fishery products; production and export of fish meal and oil; marine production of fish and shellfish by ports and by species; quantity and value of fishery products consumed in Greater Lima; landings of marine fish and their utilization; foreign trade in fishery products; and whale landings by months.

Politica Economica de la Pesqueria del Peru (Economic Policy of the Peruvian Fishery), by Javier Iparraguirre Cortez, Informe No. 18, 168 pp., processed in Spanish. Servicio de Pesqueria, Ministerio de Agricultura, Lima, Peru. Covers in detail the early history of the Peruvian fishery and its present position among the world's fishing nations; environmental aspects of the fishery, including marine ecology, currents, marine plants and animals, features of the seacoast, and port facilities; and human resources in the fishery, including types of fishermen, their training and specialization, wages, social conditions, and cooperatives and syndicates. Also contains particulars on the economic structure of the fishery, including docks and railroads, processing plants, capital assets of the industry, fishing fleet and gear, and warehouses; financial situation--public and private investment, fishery banks, and foreign investment; private fishery organizations, production and distribution, domestic consumption of fishery products, handling and distribution, foreign trade, and byproducts industries; and policy considerations in regard to conservation, nutrition, socioeconomic conditions, legal regulation, administration, and long-range planning. Included are several statistical tables showing production of industrial products by zones and by species, 1962; utilization of landings, 1953-63; export of fishery products, 1962; and other data.

PHOSPHORUS:

"The presence of compounds with a carbon-phosphorus bond in some marine invertebrates," by Louis D. Quin, article, Biochemistry, vol. 4, Feb. 1965, pp. 324-330, printed. Society for Experimental Biology and Medicine, 139th St. & Convent Ave., New York, N.Y. 10031.

POLAND:

"Operating results of B-15 and B-23 trawlers in 1964," article, Polish Maritime News, vol. 8, no. 83/84, July-Aug. 1965, pp. 14-15, illus., printed. Polish Chamber of Foreign Trade, Maritime Branch, ul. Pulaskiego 6, Gdynia, Poland.

Roczniki Nauk Rolniczych (Polish Agricultural Annual), vol. 86, series B, no. 2, 1965, 283 pp., illus., printed in Polish with Russian and English summaries. Wydzial Nauk Rolniczych i Lesnych, Polska Akademia Nauk, Palac Kultury i Nauki, 21 Pietro, Pokoj 2101, Warsaw, Poland. Some of the articles are: "The effect of increasing fish stock density in the feeding habits of young carp," and "The effect of artificial food on the feeding habits of young carp," by A. Gurzeda; "Changes in protein, fat, water, and dry weight contents in the body of two-year old carp in the period of growth," by P. Wolny, T. Wojno, and R. Trzebiatowski; "Results of feeding young carp on barley," by K. Migala; "The influence of some agencies on the results of young carp wintering," by T. Wojno, R. Trzebiatowski, and P. Wolny; and "The effect of water circulation in constant-flow winter ponds on the results of wintering of two-year old carp," by A. Wysokinski.

Available from Morskiego Instytutu Rybackiego, Wydawnictwo Morskie, Gdynia, Poland:

Prace Morskiego Instytutu Rybackiego, vol. 13, series B (Fishing Technique and Fishery Technology), 1964, 100 pp., printed in Polish. A few of the articles are: "Application of mathematical analysis of the study of the influence of physiological and ecological factors on the change of fat contents in the adult sprats of the Bay of Gdansk," by J. Elwertowski and J. Maciejczyk; "Technological and chemical characteristic of North Atlantic redfish," by K. Hryniewiecka; and "Bacterial flora of sea fish from West African fishing grounds. Part 1--Strains isolated from iced and frozen fish," by J. Kochanowski and M. Maciejowska.

_____, vol. 13, series C (Economics of Fisheries), 1964, 155 pp., printed in Polish. Some of the articles are: "Economical significance of Baltic sea-weed in Poland," by A. Ropekewski; "Fluctuations of fish landed at fishing ports," by Z. Polanski; "Frozen fish as raw material for fish processing industry (on the basis of 1959 data)," by K. Zukowski; "Analysis of the development of sea-fish consumption in Poland," by B. Kowalewski; "The consumption of fish in the light of household budgets in the period 1957-1960," by S. Laszczynski; and "Statistics of Polish fisheries 1961," by K. Kazmierski, S. Laszczynski, and M. Daszkowska.

PORTUGAL:

"Relatorio do Gremio dos Industriais de Conservas de Peixe de Setúbal" (Report of the Society of Fish Canners of Setúbal), article, Conservas de Peixe, vol. 20, no. 232, July 1965, pp. 17, 19-21, printed in Portuguese. Sociedade da Revista Conservas De Peixe, Lda., Regueirao dos Anjos, 68, Lisbon, Portugal.

POULTRY RATIONS:

"Level of fish meal in New England poultry feeds relatively high," article, Feedstuffs, vol. 37, March 6, 1965, p. 25, printed. Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis, Minn.

PROCESSING MACHINERY:

"Fish processing machine," article, Food Manufacture, vol. 39, May 1964, p. 56, printed. Grampian Press, Ltd., The Tower, Shepherds Bush Rd., Hammersmith, London W6, England.

RADIATION:

Radionuclide Content of Oceanic Fish, Plankton, and Water in Vicinity of Christmas Island, Mar.-Aug.

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1962, by Arthur D. Welander and Ralph F. Palumbo, UWFL-88, 38 pp., illus., printed, Sept. 4, 1963, $2. Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151.

RADIATION PRESERVATION:

Food Preservation by Irradiation, SB 403, Supp. 1, 17 pp., printed, revised Feb. 1965. Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151.

"Radiation preservation of meats and seafoods," by R. F. Cain and A. F. Anglemier, article, Journal of Animal Science, vol. 23, no. 2, 1964, pp. 572-576, printed. American Society of Animal Production, Colorado State University, Fort Collins, Colo.

REFRIGERATED SEA WATER:

"Refrigerated sea water as a storage medium for fish," by John A. Peters, Clarence J. Carlson, and Daniel W. Baker II, article, ASHRAE Journal, vol. 7, April 1965, pp. 64-67, printed. American Society of Heating, Refrigerating and Air-Conditioning Engineers, 62 Worth St., New York, N. Y. 10013.

REFRIGERATION:

Preservation of Fish Products by Refrigeration, by V. P. Zaitsev, TT 65-50099, 323 pp., illus., processed, 1965, $7. (Translated from the Russian, Kholodil'noe Konservirovanie Rybnykh Produktov, Pishchepromizdat, Moscow, U.S.S.R., 1962.) Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151. A comprehensive handbook covering the theory and practice of fish preservation by refrigeration (chilling, freezing, storage) and of thawing and fish-fillet production. Advanced planning of shore refrigerating plants and of refrigerated vessels is explained, and problems of product quality control are discussed. Equipment and machinery used for fish refrigeration are described. The large number of schematic drawings, diagrams, and photos should contribute to the usefulness of this book to mechanical engineers and technologists in the fish-processing industry.

SALMON:

"Food and feeding habits of Pacific Salmon (Genus Oncorhynchus) in their oceanic life, by Jun Ito, article, Bulletin of the Hokkaido Regional Fisheries Research Laboratory, no. 29, 1964, pp. 85-97, printed. Hokkaido Regional Fisheries Research Laboratory, Yoichi, Hokkaido, Japan.

"Kokanee salmon for the Great Lakes," by F. P. Maher, article, Ontario Fish and Wildlife Review, vol. 4, no. 2, Summer 1965, pp. 2-5, illus., processed. Department of Lands and Forests, Parliament Bldgs., Toronto 5, Canada.

The Migration, Composition, Exploitation, and Abundance of Odd-Year Pink Salmon Runs in and Adjacent to the Fraser River Convention Area, by A. S. Hourston, E. H. Vernon, and G. A. Holland, Bulletin 17, 156 pp., illus., printed, 1965. International Pacific Salmon Fisheries Commission, New Westminster, B. C., Canada.

"Net production of juvenile coho salmon in three Oregon streams," by D. W. Chapman, article, Transactions of the American Fisheries Society, vol. 94, no. 1, 1965, pp. 40-52, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

Population Dynamics of Pacific Pink Salmon, ONCORHYNCHUS GORBUSCHA (Walbaum), by Yu. E. Lapin, JPRS 25993. (Translated from the Russian Voprosy Ikhtiologii, vol. 4, no. 2, 1964, pp. 233-242.) Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Port Royal and Braddock Rds., Springfield, Va. 22151.

"The relationship of age to length in Puget Sound resident chinook salmon," by J. E. Lasater and Frank Haw, article, Fisheries Research Papers, vol. 2, no. 3, 1964, pp. 44-50, printed. Washington Department of Fisheries, Rm. 115, General Administration Bldg., Olympia, Wash.

Salmon of the North Pacific Ocean, Part IX--Coho, Chinook and Masu Salmon in Offshore Waters, by Harold Godfrey, James E. Mason, and Shoichi Tanaka, Bulletin No. 16, 138 pp., illus., printed, 1965. International North Pacific Fisheries Commission, 6640 NW. Marine Dr., Vancouver 8, B.C., Canada. The Commission is pulishing in its bulletin series a comprehensive report, "Salmon of the North Pacific Ocean." The purpose of this report is to present the results of research on salmon (Oncorhynchus spp.) conducted since 1955 under an extensive program designed by the Commission and executed by research organizations of the 3 countries which established the Commission--Canada, Japan, and the United States. The various parts are being published out of numerical order, each part being published as it is completed by the joint-reporting assigned to its preparation. Parts previously published were: Part I--Introduction and catch statistics for North Pacific salmon; Part II--Review of oceanography of the subarctic Pacific Region; and Part V--Offshore distribution of salmon. Part IX consists of reports on the life history and offshore distribution of coho, chinook and masu salmon on the high seas of the North Pacific Ocean.

Seal Damage to Salmon Fisheries, by B. B. Rae and William Shearer, Marine Research no. 2, 39 pp., printed, 1965. Department of Agriculture and Fisheries for Scotland, Edinburgh, Scotland.

"Steroid hormones in the plasma of spawned Atlantic salmon (Salmo salar) and a comparison of their determination by chemical and biological assay methods," by D. R. Idler, H. C. Freeman, and B. Truscott, article, Canadian Journal of Biochemistry, vol. 42, no. 2, 1964, pp. 211-218, printed. National Research Council, Ottawa, Canada.

Articles from Biological Abstracts, vol. 45, 1964. Biological Abstracts, 3815 Walnut St., Philadelphia 4, Pa.

"Age evaluation of the commercial categories of Atlantic salmon from the Pechora River" (Vozrastnaya otsenka sortovogo sostava semgi reki Pechory), by L.A. Shchetinina, no. 13, Abstract No. 54369.

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Pleasing Your Boss, the Customer, by Dwayne Laws, Small Marketers Aid No. 114, 4 pp., processed, June 1965. Small Business Administration, Washington, D. C. 20416.

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Establishing a Business in the Republic of South Africa, by Joseph L. Dougherty and William E. Rau, OBR 65-38, 15 pp., printed, June 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

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"La flota pesquera congeladora Española" (The Spanish freezer fishing fleet), article, Pesca y Marina, vol. 17, no. 4, Aug.-Sept. 1965, pp. 14-15, printed in Spanish. Fernando Flores Limitada, 705 N. Windsor Blvd., Los Angeles 38, Calif.

"El sector de la exportacion de conservas de pescados" (The canned fish export sector), by Mareiro; "Vigo, Tradicion exportadora de conservas de pescados y mariscos" (Vigo, traditional exporter of fish and shellfish), by Cristobal Anton Miranda, articles, Industria Conservera, vol. 31, no. 311, May 1965, pp. 27-28; 131-132, printed in Spanish, single copy 25 ptas. (about US$0.40). Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain.

SPINY LOBSTER:
Maintaining the Catch (The Western Australian Crayfish), 16 pp., illus., printed. Western Australian Department of Fisheries and Fauna, Perth, Australia. An informational fold-out chart for spiny lobster fishermen explaining the critical need to stabilize present catches and to find ways of increasing the stocks. Diagrams demonstrate the life cycle of the spiny lobster and biological and exploratory research being conducted on that species. The importance of fishermen supplying catch information to aid in research, as well as using pots constructed to provide escapement for undersized individuals, is also stressed.

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Foreign Trade Regulations of the Syrian Arab Republic, by Helen D. Grayson, OBR 65-52, 8 pp., printed, July 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

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Publications of the Institute of Marine Science, vol. 10, June 1965, illus., printed, single copy $4.15. Institute of Marine Science, The University of Texas, Port Aransas, Tex. 78373. Includes, among others, articles on: "Distribution and growth of penaeid shrimp in Mobile Bay, Alabama," by Harold Loesch; "Vertical distribution of the planktonic stages of penaeid shrimp," by Robert F. Temple and Clarence C. Fischer; "Fish stocks from a helicopter-borne purse net sampling of Corpus Christi Bay, Texas, 1962-1963," by Robert S. Jones; "A trawl survey of the shallow Gulf fishes near Port Aransas, Texas," by John M. Miller; "Mollusks from the deeper waters of the northwestern Campeche Bank, Mexico," by Winne H. Rice and Louis S. Kornicker; and "An annotated checklist of the fishes of the Galveston Bay System, Texas," by Jack C. Parker.

THAILAND:
Bottom Fish Resources Investigation in the Gulf of Thailand and an Outlook on Further Possibilities to Develop the Marine Fisheries in South East Asia, by K. Tiews, 42 pp., illus., printed in English with German summary. (Reprinted from Archiv fur Fischereiwissenschaft, vol. 16, no. 1, July 1965, pp. 67-108.) Archiv fur Fischereiwissenschaft, Gustav Wenzel & Sohn, Braunschweig, Federal Republic of Germany.

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Tide Tables--High and Low Water Predictions 1966--Central and Western Pacific Ocean and Indian Ocean, 386 pp., printed, 1965, $2. Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C. 20230.

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"Necesidad, conveniencia económica y técnica del transporte por carretera de los productos de la pesca en regimen de frío" (Need, economic convenience, and technique of road transportation of refrigerated fishery products), by G. Ciani, article, Revista del Frío, vol. 9, no. 3, July-Sept. 1964, pp. 99-108, printed in Spanish with French and English abstracts. Centro Experimental del Frio, Serrano, 150, Madrid, Spain.

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Le Chalut (The Trawl), by Claude Nedelec and Louis Libert, Revue des Travaux, vol. 28, no. 2, 190 pp., printed in French, 1964. Institut Scientific et Technique des Peche Maritime, 59 Avenue Raymond-Poincare, Paris 16, France.

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"Trawl for catching shrimps," by V. S. Dolbish, V.P. Krylova, and V. F. Mytsul, V. F. Translations no. 162, 5 pp., printed, 1964. (Translated from the Russian Rybnoe Khoziaistvo, no. 2, pp. 51-53, 1964.)

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Growth, Mortality Rates, and Standing Crops of Trout in New York Farm Ponds, by Alfred W. Eipper, Agricultural Experiment Station Memoir 388, 67 pp., printed, 1964. Cornell University, Agricultural Experiment Station, Ithaca, N. Y.

"Trout capital of the East," by Don Carpenter, article, Virginia Wildlife, vol. 26, no. 9, Sept. 1965, pp. 16-18, illus., printed, single copy 20 cents. Commission of Game and Inland Fisheries, P. O. Box 1642, Richmond, Va. 23213. Describes activities of the Virginia Trout Company, Monterey, Virginia, in the mountainous Northwestern part of the State. This prosperous firm rears trout from Washington State rainbow trout eggs, sells fingerlings to farmers for their own ponds, provides trout fishing streams for the use of anglers at a moderate fee, and processes frozen trout for sale to hotels and supermarkets.

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An Analysis of California's Albacore Fishery, by Harold B. Clemens and William L. Craig, Fish Bulletin 128, 308 pp., illus., printed, 1965. Documents Section. P. O. Box 1612, Sacramento, Calif. 95807. This report updates studies initiated in 1951 and sets forth results obtained from part of the albacore investigations conducted through 1961 by researchers at the California State Fisheries Laboratory. It is that State's contribution to a proposed international exchange of information on the Pacific albacore. Included are sections on the history of commercial fishing, both hook-and-line and purse-seine fisheries; the commercial fisheries for albacore during the years 1916-61; details of landings during the cold-water seasons (1951-56), the warm-water seasons (1957-59), and the cooling years (1960-61); catch analysis, using catch reports and logbook data; the sport fishery for albacore; and condition of the resource. A large number of statistical tables, graphs, and charts are used. A few of them give data on: landings of albacore in Northeastern Pacific ports by commercial fishermen, 1936-61; calculated lengths and weights for albacore age groups; and annual average of monthly sea-surface temperatures collected at La Jolla, 1916-61.

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Foreign Trade Regulations of Tunisia, by William J. Bushwaller, OBR 65-56, 8 pp., printed, July 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

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Balik ve Balikcilik, vol. 13, no. 7, July 1965, 32 pp., illus., printed in Turkish with English table of contents. Et ve Balik Kurumu G. M., Balikcilik Mudurlugu, Besiktas, Istanbul, Turkey. Two of the articles are: "One boat and two boats system trawl (Part II)," by Tekin Mengi; and "The role of fish in animal feeding and nutritional contribution of fish products (Part V)," by Macide Akgunes.

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"Fishery Limits Act, 1964" (An Act to extend the British fishery limits and amend the definition of "sea-fishing" in the Sea Fisheries Act, 1883), 31 July 1964, Statutes for 1964, Chapter 72, Food and Agricultural Legislation, vol. XIII, no. 4, June 1965, SVI/2, 3 pp., printed, single copy $1. International Documents Service, Columbia University Press, 2960 Broadway, New York, N. Y. 10027.

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Scottish Fisheries Bulletin, no. 23, June 1965, 32 pp., illus., printed. Marine Laboratory, Department of Agriculture and Fisheries for Scotland, Victoria Rd., P. O. Box 101, Torry, Aberdeen, Scotland. Some of the articles are: "Overfishing and conservation," by B. B. Rae; "Forecast for Scottish North Sea and west coast herring fisheries in 1965," by B. B. Parrish and A. Saville; "The wing-trawl on larger ships," by William Dickson; "Underwater observations on a patch of herring spawn," by C. C. Hemmings; "Herring trawling off the west coast of Scotland," by I.G. Baxter; and "Fat in herring," by N. P. Wilkins.

Scottish Sea Fisheries Statistical Tables, 1964, 50 pp., printed, 1965. Department of Agriculture and Fisheries for Scotland, Edinburgh, Scotland.

Torry Research Station Annual Report, 1964, on the Handling and Preservation of Fish and Fish Products, 57 pp., illus., printed, 1965, 5s.(about US$0.70). Ministry of Technology, Millbank Tower, Millbank, London SW1, England. (For sale by Sales Section, British Information Services, 845 Third Ave., New York, N. Y. 10022.) Covers briefly some of the Station's research projects of current interest--objective measurement of the freshness of wet fish, superchilling to 0° C., packaging of wet fish, boxing at sea, assessment of frozen fish quality, freezing fillets at sea, thawing of frozen fish, and retail quality of frozen fish. Describes in detail principal accomplishments during 1964 in the fields of improvement in handling, treatment, and quality of wet fish; freezing and cold storage; smoke-curing; canning; drying; and industrial products. Explains programs in food hygiene, bacteriological examination of shellfish, collections of marine and industrial bacteria, protein reactions during cold storage of cod, autoxidation in white fish, semiconductivity in frozen cod muscle, and industrial liaison and education. Also contains a list of reports and papers published by Torry personnel during 1964 on the handling and preservation of fish and fishery products.

Available from Grampian Press Ltd., The Tower, 229-243 Shepherds Bush Rd., Hammersmith, London W6, England:

"Conservation is main theme of British industry reports," article, World Fishing, vol. 14, no. 8, Aug. 1965, pp. 6-9, illus., printed, 3s. 6d. (about US$0.55). The 1964 annual reports of some of the major organizations serving the British fishing industry are summarized. The organizations are the White Fish Authority, The British Trawlers' Federation, The Scottish Home Department, Herring Industry Board, and Torry Research Station. One industry leader poses this question: "Should we not look to the seas, which occupy 70 percent (of the Earth's surface) and at present supply only about one percent of human food and 12 percent of the protein component of the world human diet and which . . . could provide enough protein to meet the needs of 10 times the present world population?"

World Fishing, vol. 14, no. 9, Sept. 1965, 106 pp., illus., printed. This issue, devoted almost entirely to the Scottish fisheries, contains articles on: "The 20-year-old objective"; "Ring-netting most important catching method"; "Which net do I need?"; "First of three"; "Germany switches to midwater trawl"; "Norway North Sea catch doubles"; "Herring industry at bay"; "Fishermen's views wanted"; "Will purse seine ruin stocks?"; "Norwegians in action"; "Manpower and purse seining"; "Improving seiner stability"; "Ring netters have doubts"; "How much power does a Scottish M.F.V. need?"; "Some recent completions by Scottish yards"; "Scotland's frozen escallops"; "Shellfish catch reaches record level"; "Aberdeen owners reorganize fleet"; and "Where do we go from here?"

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UNITED STATES GOVERNMENT:

Federal Statistical Directory, 1965, 195 pp., printed, Twentieth Edition 1965, 70 cents. Office of Statistical Standards, Bureau of the Budget, Executive Office of the President, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) The principal purpose of this directory is to serve as a guide to easier direct communication among the various offices of the Federal Government working on statistical programs. Contains names, titles, phone numbers, and addresses of individuals engaged in statistical planning and services in the Executive Office of the President; Departments of Agriculture, Commerce, Defense, Health, Education, and Welfare, Interior, Justice, Labor, State; the Post Office Department; Treasury Department; independent agencies such as the Atomic Energy Commission, Federal Aviation Agency, and National Labor Relations Board; and agencies outside the Executive Branch including U. S. Courts and offices associated with the Congress.

UNITED STATES NAVY:

The Ships and Aircraft of the U. S. Fleet, compiled and edited by James C. Fahey, 64 pp., illus., printed, eighth edition 1965, $3.50. U. S. Naval Institute, Annapolis, Md. 21402.

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Opredelitel' Promyslovykh Ryb SSSR. Uchebn. Posobie Dlya Ikhtiologich. Spetsial'nostei Vyssh. Uchebn. Zavedenii. 4-e Pererabot. i dop. izd (Key for the Identification of U.S.S.R. Commercial Fishes. A Textbook for Students of Ichthyology in Colleges and Universities. Fourth Revised and Enlarged Edition), 318 pp., illus., printed in Russian. 1964, 70 Kop. (about US$0.80). Pishchepromizdat, Mruzooskii, Propekt No. 1, Moscow, U.S.S.R.

Translations from the Russian available from the Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Port Royal and Br ddock Rds., Springfield, Va. 22151:

Freshwater Fishes of the U.S.S.R. and Adjacent Countries, by Leo S. Berg, vol. II, OTS 63-11056, 496 pp., and vol. III, OTS 63-1105", 510 pp., printed, 1964 and 1965.

Key to Parasites of Freshwater Fish of the U.S.S.R., by Bykhovskaya Pavloskaya and others, OTS TT 64-11040, 919 pp., printed, 1964.

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"Use of a hydraulic system on a stern trawler," by A. M. Chukhontsev, pp. 87-89; and "New system of payment for the fishermen," pp. 93-94.

_____, vol. 40, no. 9, September 1964: "Some results of acclimatizing pink salmon in North Europe," by V. V. Azbelev and M. Lazarev, pp. 7-8; "There will be more salmonid fishes," p. 30; "Selection of an optimum load and speed of freeze trawlers during fishing cruises," by S. I. Logachev, pp. 36-39 (continuation of article in no. 8, pp. 47-49). "Catamarans, a possible type of vessel for the fishing fleet," by Yu. M. Rizanov, pp. 40-41; "Bathythermograph for fishing vessels," by A. Ovsyannikov, pp. 41-42; "Mechanization of roe salting," p. 49; "Present work of vessels of the BMRT type (freezer trawlers) and of side trawlers," by L. N. Pechenik, pp. 51-53; "Shark fishery in the Atlantic Ocean," by Yu. A. Torpin, pp. 54-57; "Prospects for using ice with biomycin for preserving fresh, cooled fish," by G. B. Dubrova and Yu. A. Ravich-Shcherbo, pp. 60-61; "Variation in the total effort in cutting tunny with a knife with a straight edge (blade)," by M. A. Yakubov, pp. 62-65; "Machine for breading fish in an electric field with corona discharge," by N. I. Tikhonov, pp. 65-69; "The Economic efficiency of mechanization and automation on fishing vessels," by E. I. Futter and M. M. Kantor, pp. 73-74; "A new, small-sized meal-and-oil plant for trawlers," by N. N. Ryndich, pp. 81-83; and "The first teaching manual on the economy of the fishing industry" (S. V. Mikhailov, 1962. The economy of the fishing industry of the U.S.S.R. Pishchepromizdat, Moscow), pp. 90-91.

_____, vol. 41, no. 3, 1965, 100 pp., printed in Russian. Some of the articles are: "Stock of individual schools of herring in the North Atlantic," by S. S. Fedorov; "Growth and maturation as main factors of the dynamics of fish stock," by M. A. Pavlov; "Apparatus for censusing young commercial fishes caught by fine-meshed nets," by R. A. Mailian; "Effect of predatory fishes on the extension of seaward migration of salmon," by E. L. Bakshtanskii; "Abundance and fisheries of crayfish in the bodies of water of Volgograd Province," by V. P. Negrobov; "Mooring of a BMRT to a floating base and loading and unloading works at sea from both sides," by I. F. Tolkodubov; "Trawling at great depths," by A. Ia. Maklakov; "Characteristics of fishing operations in the Central Atlantic," by L. N. Domanevskii and O. G. Riabikov; "First result of two-boat trawling," by G. G. Krylov; "Selection of light arrangement in electric fishing," by I.V. Nikonorov; "Methods of electric fishing in the inland bodies of water," by M. R. Maizella; "Combined synthetic coatings for the preservation of fishery products," by M. N. Vakhrusheva; "Content of carcinogenic substances in smoke and smoked products," by P. P. Dikun; "Methods of producing slightly salted caviar from the Pacific salmon," by E. A. Nasedkina; "Rapid method of agar extraction," by O. P. Lukachev; "New agar plant in the Maritime territory," by V. D. Koval'; and "Some problems of whaling," by A. A. Sudakov.

_____, vol. 41, no. 4, 1965, 95 pp., printed in Russian. Some of the articles are: "Technological progress in the fishing industry in 1965," by E. G. Pavlov; "Forecasting relative yield of the Baltic cod and bank herring of the North Sea," by A. E. Antonov; "Considerations on ways of development of pond fish culture," by K. A. Sadlaev; "Some characteristics of the growth and wintering of young-of-the-year herbivorous fishes," by I. N. Biziaev; "Marking whales in the Far East," by V. A. Arsen'ev; "Determination of the form of the net part of a trawl by photogrammetry," by G. E. Bidenko; "Polystyrene floats for trawl fishing," by B. P. Zimin; "Methods of electric fishing in freshwater bodies," by M. R. Maizelis; "New process of cold bream and roach smoking," by L. E. Shavshaeva; "Use of a sardine dryer of continuous action for the production of 'herring in oil'

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

canned fish," by Z. T. Nechaeva; "Mathematical approach in the administration of fisheries," by V. Tishinskii; "Some problems of organizing paired expeditions by fishing boats," by N. Medushevskii; and "System of national control in observing fishing regulations in the North Atlantic," by A. D. Druzhinin.

Articles from Rybovodstvo i Rybolovstvo, 1959, printed in Russian. Rybovodstvo i Rybolovstvo, Orlikov Pereulok 1/11, Moscow I-139, U.S.S.R.:

"Sortirovochnyi ryboulovitel'" (Selective fishing gear), by G. Kondrat'ev, no. 4, pp. 16-17.

"Tovarnyi karp v nerestovo-vyrostnom" (Growing commercial carp in nursery pond farms), by G. Zhukovskii, no. 4, pp. 3-7.

"Vyrashchivanie ryboposadochnogo materiala v kolkhoze" (Growing fish stock in a kolkhoz--collective farm), by G. Polyakov, no. 3, pp. 5-8.

Articles from Trudy, Atlanticheskii Nauchno-issledovatel'skii Institut Morskogo Rybnogo Khoziaistvo i Okeanografii, "AtlantNIRO" (continues Trudy Balt-NIRO), vol. 10, printed in Russian, 1964. Four Continent Book Corp., 156 - 5th Ave., New York, N. Y. 10010:

"Spawning area of Atlantic herring at the western coasts of the Shetland, Orkney, and Hebrides Islands," by L. S. Shapiro, pp. 95-99; "Distribution of bottom fishes at Newfoundland and Labrador, and a possible forecasting of commercial concentrations," by B. E. Karasev and V. I. Sauskan, pp. 124-141; "Present state of the herring stock and the herring fishery in the North Sea," by G. P. Domashenko, pp. 142-149; "Composition of the stocks of ocean perch, cod, and haddock in the Newfoundland and Labrador regions," by A. S. Noskov and V. A. Rikhter, pp. 150-162; "Productivity of Atlanto-Scandian herrings," by A. S. Noskov, pp. 163-167; "Possibility of forecasting the time of spawning immigration to the Norwegian coast of Atlanto-Scandian herring," by K. M. Rudnev and T. A. Bernikova, pp. 168-170; "Forecast of long-term variations of relative abundance of cod, sprat, and herring in the southern Baltic for the years 1961-80," by A. E. Antonov, pp. 171-175; "Determination of the stock of commercial fish by using data from fishery and the stock," by I. G. Fridlyand and A. T. Erokhin, pp. 176-178; "Method of determining age and growth of Baltic cod," by G. I. Tokareva, pp. 179-191; "New fishing areas at northwestern Africa," by K. G. Kukhlorenko, pp. 205-208; "Method of estimating the fish-holding ability of stationary seine traps," by Yu. S. Sergeev, pp. 221-240; "Selection of optimum speed during bottom trawling of herring from large (BMRT) trawlers," by G. E. Bidenko, pp. 249-260; "Determining the influence of wind and currents on trawling," by G. E. Bidenko, pp. 261-265; "Calculating the depth of the net's edge for an occasional lowering of the net mass," by N. N Andreev, pp. 283-291; "Calculating the suction depth of the fish pump by deep lowering of the suction hose," by M. M. Rozenshtein, pp. 292-302; "Freezing of sprat on fishing vessels," by L. S. Baidalinova, pp. 319-320; "Optimum thermal regime by cold smoking of herring," by V. N. Podsevalov and L. S. Baidalinova, pp. 321-337; "Basis for sterilizing preserved fish in the light of Boll's theory," by S. A. Artyukhova, pp. 338-343; "Increasing the accuracy of the individual operation in the technological processing of sprat from frozen raw material," by M. S. Bidenko, pp. 344-357; and "A comparison of the efficiency in the use of BMRT trawlers from Murmansk and Kaliningrad in the Newfoundland area in 1960," by A. I. Kirillova, pp. 358-364.

Trudy Kaliningradskogo Tekhnicheskogo Institut Rybnoi Promyshlennosti i Khoziaistvo, no. 14, 1962, 170 pp., printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010. Some of the articles are: "Study of the process of purse seining by the method of mechanical imitation," by N. N. Andreev; "Stability of the central wire of the leading wing of a stationary seine," and "Catching ability of a bottom seine," by V. A. Ionas; "Theoretical investigation of the use of a tuna fishing line," by L. I. Metelkin; "Storm resistance (stability) of stationary seines," by V. M. Pankov; "Catching ability of stationary salmon seines," and "Study of the efficiency of stationary salmon seines on the western coast of Kamchatka," by E. D. Karakotskii; "Use of the circulation-breaking theory of a rectangular wing of small length for determining the hydrodynamical characteristics of a trawl door," by A. L. Fonarev; "Preliminary results of the study of the resistance of a net," by E. Iu. Obolenskii; "Stocks, forecasts and real catches of fish in the Azov Sea," by N. T. Senin; and "Some problems in the experimental study of the catching ability of trawls," by V. P. Kondrat'ev.

_____, vol. 18, 1964. Some of the articles are: "Conditions for comparing fishing gear," by S. L. Fridman, pp. 181-199; "The shape of the opening of the bottom trawls," by V. P. Kondrat'ev, pp. 200-202; "Use of fish intestines for producing feed products rich in B vitamins," by P. I. Andrushenko, pp. 271-274; and "Rapid method for determining fat content in herring on board vessels," by I. N. Simonova and L. K. Davydova, pp. 275-279.

Trudy Vsesoiuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii, vol. 49, 1964, 260 pp., printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010. Some of the articles are: "Biology and fishery of the Kamchatka crab Paralithodes camtschatica (Tilesius) in the southeastern part of the Bering Sea," by N. G. Korolev; "Quantitative distribution of the bottom fauna in the Gulf of Alaska," by V. V. Shevtsov; "Some results of the study of the biology and distribution of shrimps in the Pribilof area of the Bering Sea," by B. G. Ivanov; "Feeding habits of ocean perch in the Bering Sea," by V. A. Skalkin; "Basic characteristics of the biology of the Pacific halibut (Hippoglossus hippoglossus stenolepis Schmidt) in the Bering Sea," by N. P. Novikov; "Materials on the biology of rock sole (Lepidopsetta bilineata)," by D. A. Shubnikov and L. A. Lisovenko; "Materials on the biology of some flounder species in the eastern part of the Bering Sea," by T. A. Mineava; "Herring in the eastern part of the Bering Sea," by Iu. I. Dudnik and E. A. Usol'tsev; " Intraspecific variation of the Pacific ocean perch (Sebastodes alutus Gilbert)," by V. V. Barsukov; and "Chemical characteristics of

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the yellowtail flounder, codfish and Alaska pollock in the southeastern part of the Bering Sea," by M. N. Krivobok and O. I. Tarkovskaia.

_____, vol. 50, 1964. Some of the articles are: "Methods of estimating relative abundance of populations of commercial stocks, and rate of exploitation by the fishery," by T. F. Dement'eva, pp. 7-38; "Method for studying the biological features in fish populations and their variations," by K. A. Zemskaya, pp. 39-44; "Problems associated with estimating a rational fishing intensity," by V. A. Abakumov, pp. 179-191; "Main stages in the development of the sturgeon fisheries in the Caspian water basin," by Z. S. Korobochkin, pp. 59-86; "Comparative characteristics of fishery and biology of Azov Sea sturgeons," by N. L. Chugunov and N. I. Chugunova, pp. 87-182; "Fishery and biology of the Caspian beluga (Huso huso Linne), by N.Ya. Babushkin, pp. 183-258; "Present state and forecasting of fluctuations in the stocks of Acipenser stellatus in the Caspian Sea by regulated river flow," by M.P. Borzenko, pp. 259-286; "Acipenseridae in the northwestern Black Sea," by A.I. Ambroz, pp. 287-347; and "Biology, breeding (artificial reproduction), and fishery for Acipenseridae; bibliography," by G. A. Potapova, pp. 348-409.

Articles from Voprosy Ikhtiologii, vol. 4, no. 1, 1964, printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U.S.S.R.:

"O kormovoi baze dlya pelagicheskikh promyslovykh ryb oz. Baikal" (The food supply of pelagic commercial fishes in Lake Baikal), by M. M. Kozhov, pp. 125-135.

_____, vol. 4, no. 2, 1964. "Sturgeons from the Samur River," by Yu. S. Saidov, N. A. Azizova, and N.A. Okolot, pp. 243-248; "Influence of water temperature on the fish supply available to Barents Sea trawling," by K. G. Konstantinov, pp. 255-269; and "Comparative characteristics of the river growth of salmon (Salmo salar) naturally spawned and artificially hatched," by L. A. Petrenko, pp. 342-347.

_____, vol. 4, no. 3, 1964. "Fish behavior and fishing technique," by D. V. Radakov and A. I. Treshchev, pp. 401-410; and "On the biology of the polar cod, Boreogadus saida (Lepechin)," by B. K. Moskalenko, pp. 433-442.

VENEZUELA:
Principal Manufacturing Industries in Venezuela, OBR 65-45, 32 pp., printed, July 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A few paragraphs deal with fish and shellfish canning, and frozen shrimp.

"La zona marina de la isla Margarita" (The marine area of Margarita Island), by Ramon Margale, article, Iberica, vol.43, no.37-38, July-Aug. 1965, pp.270-273, illus., printed in Spanish, single copy 30 ptas. (about US$0.50). Iberica, Palau, 3, Apartado 759, Barcelona-2, Spain.

WEATHER CHARTS:
The following processed weather charts, 4 pp. each, are published by the Weather Bureau, U. S. Department of Commerce, Washington, D. C. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, 10 cents each. Charts show stations displaying small craft, gale, whole gale, and hurricane (coastal charts only) warnings; explanations of warning displays; and schedules of AM and FM radio, TV, and radiophone stations that broadcast weather forecasts and warnings.

Coastal Warning Facilities Chart, Manasquan, N. J., to Cape Hatteras, N. C., and Chesapeake Bay, 1965, C 30.22/3:M 31/965.

Coastal Warning Facilities Chart, Montauk Point, N.Y. to Manasquan, N. J., 1965, C 30.22/3:M 76/965.

Small Craft, Gale and Whole Gale Warning Facilities Chart, Great Lakes: Huron, Erie, and Ontario, 1965.

WEST AFRICA:
"La peche en Afrique occidentale en 1964" (The West African fishery in 1964), article, La Peche Maritime, vol. 44, no. 1048, July 1965, pp. 564-567, illus., printed in French, single copy 14 F. (about US$2.85). Les Editions Maritimes, 190, Blvd. Haussmann, Paris, France.

WESTERN EUROPE AND CANADA:
Market Profiles: Western Europe and Canada, OBR 65-34, 20 pp., printed, June 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

WHALING:
International Commission on Whaling--Fifteenth Report of the Commission (Covering the Fifteenth Fiscal Year 1st June 1963 to 31st May 1964), 72 pp., illus., printed, 1965. International Commission on Whaling, Whitehall Place, London SW1, England. This report covers the Fifteenth Meeting of the Commission, held in London, July 1-5, 1963, and the meeting of the Scientific Committee at Sandefjord, June 16-19, 1964. Information is given on catch limitation and quotas for member countries; the 1963/64 catch by Antarctic pelagic expeditions, land stations, and factoryships; Antarctic pelagic whaling season for the various species; report of the Scientific Committee on the state of the Antarctic whale stocks; and recommended regulation of blue, fin, sei, and sperm whales. Also covered are blue and humpback whale stocks in the North Atlantic; North Pacific stocks; continuation of whale marking programs; scientific investigation of the whale stocks by a special committee; international observer program; Commission finances; permits to take whales for scientific purposes; and committee meetings. Among the appendixes are the agenda for the Fifteenth Meeting; note on the effects of various catch quotas; infractions reported during the 1963/64 season (Antarctic) and the 1963 season (outside the Antarctic); statistical data on the whale oil production, 1953/54-1963/64; and map of the world showing Antarctic areas and the regions closed to factoryships for taking and treating baleen whales.

"Of whales and whaling," by Noel Simon, article, Science, vol. 149, no. 3687, Aug. 27, 1965, pp. 943-946, printed, single copy US$0.35. American Association

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for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005. Reviews the history of whaling, efforts at catch restrictions by the International Whaling Commission, decline of the Antarctic whaling stocks, and recommendations for restoring the stocks. The author emphasizes that: "Rational utilization of this resource is perfectly legitimate, but exploitation to the point of extermination is as inexcusable as it is shortsighted. Quite apart from ethical considerations, total destruction of whale stocks does not make very good economic sense. . . . Adoption by the commission of the recommendations of its own scientific advisers . . . would provide a blueprint both for ensuring the continuance of whale stocks and for securing the whaling industry's own means of existence."

"The world catch 1964," article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 54, no. 7, July 1965, pp. 151-162, illus., printed in Norwegian and English. Hvalfangerforeningen, Sandefjord, Norway.

YEARBOOK:
Consumers All--The Yearbook of Agriculture 1965, 510 pp., illus., printed, Sept. 1965, $2.75. U. S. Department of Agriculture, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) The 1965 edition of the Yearbook of Agriculture is devoted to furthering the art of being a thoughtful and discerning consumer. Chapters are grouped according to subject--houses, furnishings, equipment, finances, safeguards, plants, outdoors, recreational activities, clothing, and food. Although no chapters on fishery products are included, the general subject of food is given major attention--including diets for weight-watchers, savings in buying food, and suggestions for preparing meat, vegetables, dairy products, bread, beverages, and other products. Fish is mentioned incidentally when discussing calorie value, cooking, diet needs, and refrigeration.

CORRECTION

In the October 1965 issue, page 119, Fish as Food. Vol. III--Processing: Part 1, the address of the publisher was omitted. The publisher is Academic Press Inc., 111 Fifth Ave., New York, N. Y. 10003.

THIS CHRISTMAS TREE IS SHRIMPLY DELICIOUS

In answer to many requests, the United States Department of the Interior's Bureau of Commercial Fisheries has once again released instructions for its Shrimp Christmas Tree for the most exciting holiday table in the neighborhood.

From a commanding position on a buffet table or as a colorful centerpiece for a well-appointed holiday dinner, this unusual tree is certain to capture compliments. Leafy green endive duplicates crisp holly while ever-popular shrimp add shape and color interest to this creative conversation piece.

This intriguing tree is elegant but deceivingly simple. The materials are readily available at most local variety stores and supermarkets.

SHRIMP CHRISTMAS TREE

3 pounds shrimp, fresh or frozen
2 quarts water
½ cup salt
4 large bunches curly endive
1 styrofoam cone, 2½ feet high
1 styrofoam square, 12 x 12 x 1 inch
1 small box round toothpicks
Cocktail Sauce

Thaw frozen shrimp. Place shrimp in boiling salted water. Cover and simmer about 5 minutes or until shrimp are pink and tender. Drain. Peel shrimp, leaving the last section of the shell on. Remove sand veins and wash. Chill. Separate and wash endive. Chill.

Place cone in the center of the styrofoam square and draw a circle around the base of the cone. Cut out circle and insert cone. Cover base and cone with overlapping leaves of endive. Fasten endive to styrofoam with toothpick halves. Start at the outside edge of the base and work up. Cover fully with greens to resemble Christmas tree. Attach shrimp to tree with toothpicks. Provide Cocktail Sauce for dunking. Serves 12.

FISHERY EXPERTS NEEDED FOR TECHNICAL ASSISTANCE IN MANY COUNTRIES

There are many technical assistance projects in nearly all of the developing countries of the world for which FAO is responsible. The following is a list of vacancies as of October 1, 1965, for which FAO is recruiting. Write (on a confidential basis if desired) to: Roy I. Jackson, Director, Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle terme di Caracalla, Rome, Italy.

The following list shows the country in which the vacancy exists, the types of fishery experts needed (in parentheses the duration of the assignment in months for the fiscal year 1965/66, with a possibility for extension):

Aden: Marine Biologist (24), Masterfisherman (32).

Argentina: Marine Biologist (60), Oceanographer (42), 2 Trawl & Purse Seine Technologists (60 & 36), Accoustics Technologist (24), Economist (54).

Brazil: Shrimp Biologist (12), Fishery Training Expert (24).

Central America: 2 Marine Biologists (48 & 33), Economist (48), Masterfisherman (47), 2 Fishing Gear & Methods Experts (47 & 48), 2 Fish Processing Technologists (30).

Ceylon: Masterfisherman (15), Fishing Gear Technologist (15).

Congo (Brazzaville): Marine Resources Survey Project Manager (36).

Cuba: Fishing Gear Technologist (9).

East Pakistan: Marine Biologist (60), Fish Processing Technologist (36), Marketing Economist (48), Statistician (36), Marine Engineering Technologist (12).

Ghana: Demersal Biologist (45), Gear Technologist (48), Masterfisherman (48), Fishery Training Expert (12).

India: Fish Processing Technologist (6), Reservoir Fishing Technologist (9), Fishing Harbor Survey Project Manager (36).

Iran: Inland Fisheries Biologist (6).

Jamaica: Masterfisherman (15).

Lake Kainji: Economic Development Project Manager (60).

Lake Kariba: Gear Technologist (42).

Lake Nasser: Economic Development Project Manager (60).

Lake Victoria: Statistician (24), Masterfisherman (36), Cost Economist (24).

Malaysia: Fishery Development Adviser (12).

Mexico: Fishery Development Adviser (12), Marketing Economist (12), Masterfisherman (18).

Nigeria: Masterfisherman (15), Marine Biologist (35).

Peru: Marine Resources Survey Project Manager (48).

Philippines: Fish Processing Technologist (24), 2 Marketing Economists (48), Naval Architect Technologist (30).

Senegal: Fishing Gear Technologist (9).

Sierra Leone: Marine Resources Survey Project Manager (60).

RAINBOW TROUT FINGERLINGS PLANTED IN WESTERN LAKE BY AIRPLANE

The rainbow trout population of Lake Powell in Arizona and Utah was increased by 4 million fish in May 1965 from hatcheries of the Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior. The rainbow trout fingerlings were air-dropped 200,000 at a time in one of the largest aerial stockings of fish ever undertaken.

Fig. 1 - Airplane planting of young fish in Lake Powell.

Fig. 2 - Another view of airplane dropping fingerlings in Lake Powell.

The fish drops began the morning of May 11, immediately north of Glen Canyon Dam and continued progressively upstream during a five-day period to provide wide dispersion of the trout. The fingerlings were dropped, along with water, from an altitude of 300 feet, with 4 drops made on each flight. They were supplied by National Fish Hatcheries of Interior's Bureau of Sport Fisheries and Wildlife. The hatcheries are at Willow Beach, Alchesay, and Williams Creek, Ariz., and at Saratoga, Wyo.

Similar aerial fish stockings in 1963 and 1964 planted 7.6 million trout and 3 million black bass in the lake with only minor losses from impact on the lake surface.

Glen Canyon Dam, on the Colorado River at the Arizona-Utah border, was constructed by Interior's Bureau of Reclamation. The dam is 710 feet high and has a 1,550-foot-long crest. Its reservoir, Lake Powell, eventually will extend 186 miles upstream and will have a surface of 162,700 acres, with a shoreline that will extend almost 1,900 miles.

When the new stocking program is completed, a total of nearly 15 million fish from Federal fish hatcheries will have been planted in Lake Powell. That lake already ranks as one of the best fishing spots in the West.

FISHERY MARKET NEWS OFFICES

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Hampton, Virginia 23369	W. N. Kelly, Post Office Box 447 TWX 703-722-2967	Park 3-3360
New Orleans, Louisiana 70130	E. J. Barry, Rm. 608, Federal Bldg. 600 South Street.	527-6151
San Pedro, California 90731	V. J. Samson, Rm. 208, Post Office Bldg. TWX 213-548-0920	831-9281 Ext. 271
Seattle, Washington 98104	C. M. Reardon, 706 Federal Office Bldg. 909 First Avenue, TWX 206-998-0211	Main 2-0740
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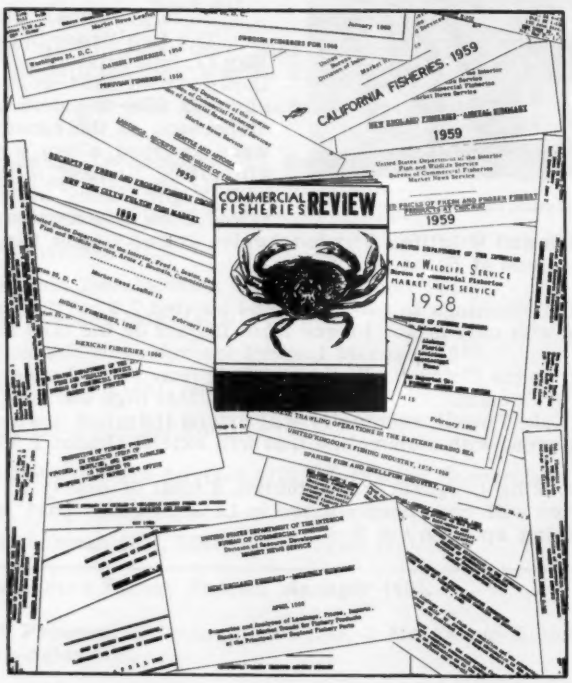
A PHOTOMONTAGE OF MANY OF THE REPORTS CURRENTLY RELEASED BY THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES



HIGHLIGHTS IN THIS ISSUE (DECEMBER 1965)

Features

A JAPANESE GILL-NET FISHERY FOR BOTTOMFISH IN THE GULF OF ALASKA--Exploring areas where trawling is normally not permitted (p. 1).

REDUCTION PROCESS TO CONVERT RAW FISH INTO THIAMINASE-FREE PRESS CAKE--Increases the use of rough fish in small fishing operations (p. 13).

Trends in the United States Fisheries

FISHERY TECHNOLOGY DEVELOPMENTS--A rapid field method for determining the salt concentration in fresh and smoked chub (p. 18).

TRANSPORTATION AND MARKETING AID--New plastic fish boxes to aid fresh fish marketing (p. 21); airline cuts rates 40 percent on northwest fishery shipments to eastern points (p. 44).

CENTRAL PACIFIC--Oxygen studies in relation to catching tuna (p. 28); submarine for underwater research brings new discoveries (p. 29).

BLUE CRAB--Cleaner-debacker machine to be tested under commercial conditions (p. 27).

GREAT LAKES--Michigan plans to introduce striped bass in southern waters (p. 32).

OCEANOGRAPHY--Coast guard cutter Northwind completes major study in Siberian Arctic (p. 42); Sea Lab II report will be featured at symposium in Washington, D. C. (p. 43); study of unmanned buoys off Massachusetts (p. 44).

Reports on Foreign Fisheries

FOOD AND AGRICULTURE ORGANIZATION--Designing with computers discussed at third international technical meeting on fishing vessels (p. 47).

NORTH SEA--Special fishery charts published (p. 48).

ECUADOR--Export opportunity for fishing vessels and processing equipment (p. 54).

ICELAND--Landings, foreign trade, and fisheries trends (pp. 56-59).

REPUBLIC OF KOREA--Large-scale expansion of fishing industry planned (p. 72).

JAPAN--Trends in major fisheries--tuna, crab, salmon, shrimp, swordfish, saury, and pollock (pp. 60-70); new portable tuna catcher vessels (p. 71); improved method for setting and retrieving long-line gear developed (p. 72).

NORTH VIET-NAM--Fishing fleet expands with Soviet aid (p. 75).

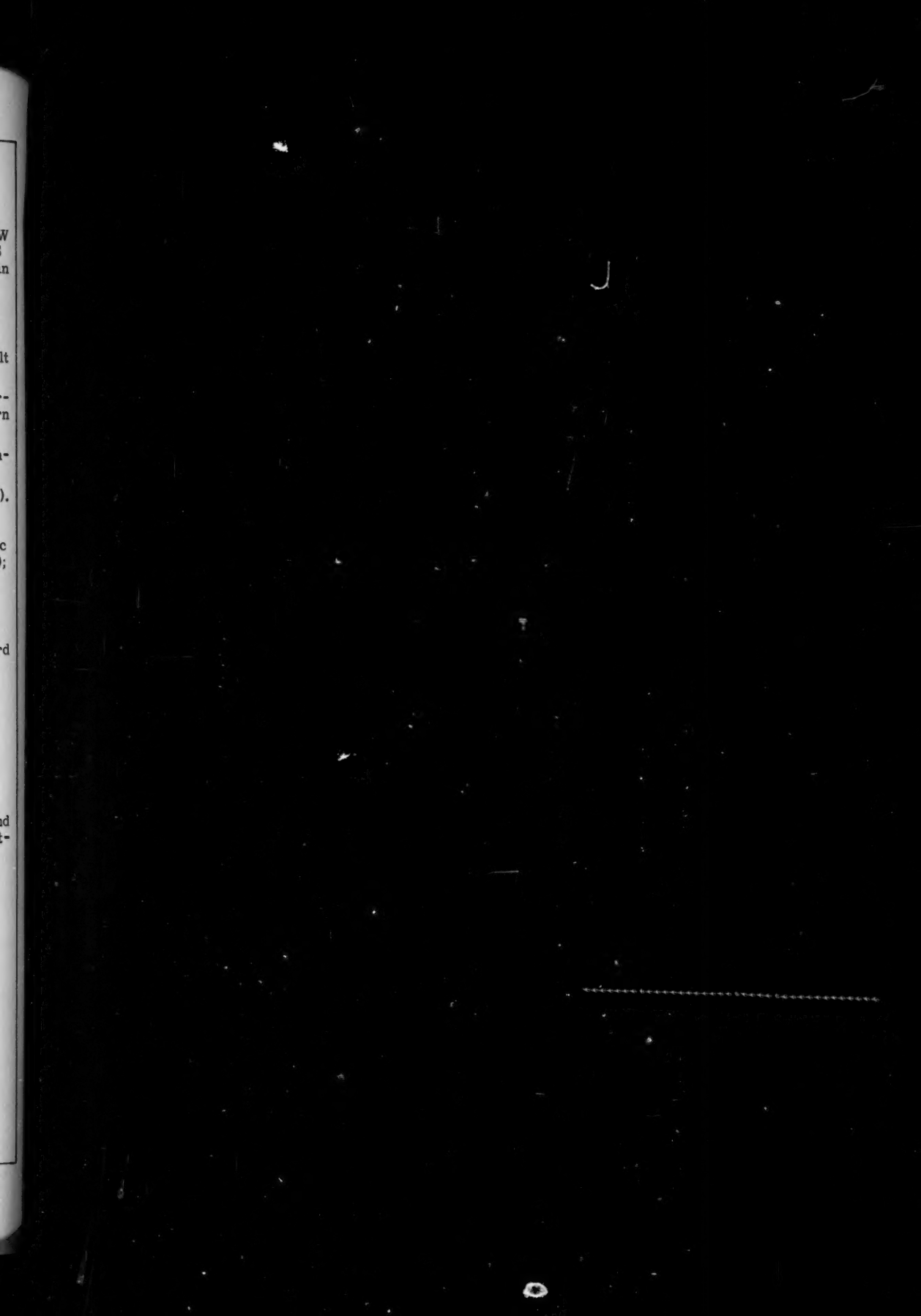
MEXICO--United Nations special fund projects to aid fisheries development (p. 74).

PANAMA--Fisheries development outlook (p. 77).

U.S.S.R.--Use seaweed for animal feed (p. 82).

UNITED KINGDOM--Lobster hatching experiments in Guernsey (p. 82).

ALSO FISHERY NEWS FROM 16 OTHER COUNTRIES.

Plus

Fisheries in Alaska, California, American Samoa, Great Lakes, Louisiana, and Washington; industrial products; State and Federal actions affecting fisheries; reviews of recent fishery publications throughout the world.